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NEWSPAPER

COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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Programmers Found 'DP Illiterate'

By Jeffry Beeler
CW West Coast Bureau

BERKELEY, Calif. — Lack of effective on-the-job training has reduced many computing operations to a "state of controlled chaos" and has led to widespread DP illiteracy among programmers, according to consultant, writer and lecturer Gopal Kapur.

Most DP organizations fail to understand the relationship between continuing education and a high level of programmer performance, Kapur said last week at a Spectrum International, Inc. users group meeting here. As a result, most installations skimp on employee training and in so doing leave their programming staff with stunted professional skills and a minimum level of computing knowledge.

Kapur based his conclusion on the findings of numerous studies conducted by his San Francisco-based consulting firm, Kapur and Associates, Inc. In a presentation entitled "The Illiterate [sic] Programmer," the consulting firm president quoted survey results that showed training accounts for less than 1% of the typical computing site's annual DP budget.

Such an allocation would probably prove acceptable for a field whose technology remains relatively static. But for a discipline like computing where the state of the art advances about 30% a year, a 1% expenditure — or less — for training seems woefully inadequate, Kapur lamented.

"A user that is spending only 3% of its DP budget on training is in consistently bad shape," and -7% is probably a much more realistic figure, the speaker added in comments following his formal address.

As an example of a company whose budget

(Continued on Page 7)

IBM Unveils Color Display With Graphics

By Brad Schultz
CW Staff

WHITE PLAINS, N.Y. — Users can now get seven-color graphics with IBM's latest display station, which with an associated four-color printer put the mainframer squarely in the moderately priced color graphics arena last week.

Both of the color graphics products communicate with IBM's 370, 4300 and 8100 CPUs and deliver four-color support of current 3270 terminal tasks with "little or no reprogramming," a spokesman said.

The 3279 display station is available in four versions: a 1,920-char. (24-line) model that produces alphanumeric data in red, green, blue and white or in those four colors plus pink, yellow and turquoise; and a 2,560-char. (32-line) model that is available with either the four or seven colors.

The 3287 color printer can give the user a printed copy of the alphanumeric or optional graphics data displayed by the 3279, but is limited to

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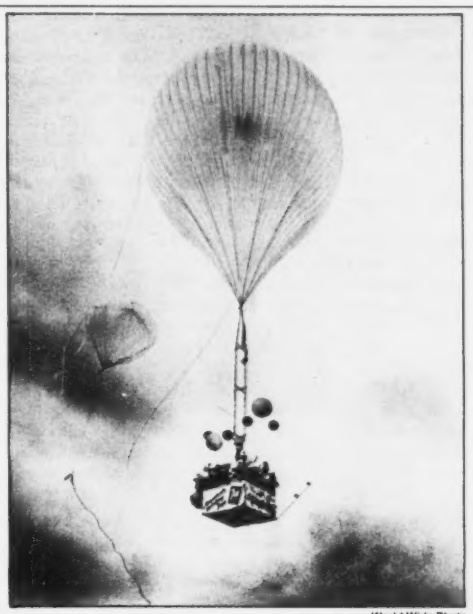

World Wide Photo

High Hopes

The crew of the 10-story DaVinci Transamerica, using a minicomputer-plotted course and backed by a DP tracking system, failed in its attempt to make the first nonstop transcontinental crossing by balloon last week **(See story on Page 7).**

Third-Party Firms Say Justice Ignoring Breach Of '56 Decree by IBM

By E. Drake Lundell Jr.
CW Staff

WASHINGTON, D.C. — The Department of Justice knows that IBM is violating a 1956 Consent Decree the firm entered with the government, but Justice has refused to take action on those violations, trade associations representing more than 150 industry firms charged last week.

In a private meeting in the headquarters of the Computer Lessors Association (CLA), lawyers for the Antitrust Division of the Justice Department agreed with CLA contentions that IBM is violating the decree, James F. Benton, CLA executive director, said last week.

However, the Justice attorneys said the department would not "seek to enforce the decree because of staffing and tactical reasons beyond its control," according to a position paper issued jointly by the CLA and the Computer Dealers Association (CDA).

The two groups, which between them represent about 150 firms engaged in third-party leasing, brokering and dealing in computer equipment, claim that the IBM trade-in policies recently announced for the 370/158, 370/148 and 370/138 computers [CW, Sept. 3] violate the antitrust laws in general and specifically go against the 1956 agreement between the government and IBM.

That agreement was made in order to settle an antitrust case

(Continued on Page 4)

Two Minis Debut

Burroughs Extends B900s

By Tim Scannell
CW Staff

DETROIT — Burroughs Corp. has expanded its B900 family of computers with the introduction of a series of small business systems that can function in stand-alone or remote-processing modes.

The B90 series consists of two models, the B91 and B92, and each can accommodate up to 512K bytes of main memory and a variety of disk media — including the firm's Super Mini-Disk II, a 6M-byte capacity drive that can store 3M bytes of data on each of two flexible disks, a spokesman stated.

The entry-level B91 incorporates a large-scale integrated circuit processor, a CRT that is switchable between a 256-char. and a 1,920-char. mode, a keyboard, a 90 char./sec bidirectional matrix printer and the Mini-Disk disk storage system. The unit has six I/O channels, up to two disk controllers and up to two data communications channels. The system also includes 4K bytes of memory for cold/warm starts and maintenance test routines and is fitted to perform on-board diagnostic routines, the spokesman continued.

The B92 minicomputer has the same processor, main memory and storage capacities, but boasts up to 11 I/O

(Continued on Page 2)

Industry Says FCC Separation Of AT&T, Subsidiary Inadequate

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Insulation of AT&T's monopoly services from its emerging computer and communications offerings was the major worry of the DP industry in the comments it submitted to the Federal Communications Commission's (FCC) Second Computer Inquiry last week.

The Computer and Communications Industry Association (CCIA) contended the FCC's tentative decision, issued last July, doesn't provide enough separation between AT&T and the subsidiary through which it would be allowed to market DP and other computer-based hardware/software services.

Specifically, CCIA wants all data terminal equipment provided by AT&T to be manufactured by a fully-separated subsidiary. The tentative decision requires only that such equipment be "offered" by the subsidiary, and it isn't clear from the language, CCIA said, that Bell couldn't offer at least some of this equipment directly.

CCIA also argued that the commission, by allowing AT&T to enter the DP business, was modifying Bell's 1956 consent decree — something the FCC isn't legally empowered to do,

(Continued on Page 6)

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More Terminals Supported

Itel Enhances Maestro Software

By Don Leavitt
CW Staff

SAN FRANCISCO — Most of the software Itel Corp. has been offering for its IBM 360 equipment moved to National Semiconductor Corp., along with that equipment and the firm's IBM-compatible mainframes, when National Semi took over Itel's Data Product Group recently.

Itel, however, retained its interest in the Maestro on-line program development system and just last week announced an enhanced version of the software behind the system. The revision supports more terminals with more flexibility than before and at a sharply reduced costs per terminal, according to Bobby Cabannis, who has been named to head Itel's Maestro operations.

National Semi has not yet announced any development or marketing plans for any of the software packages previously produced by Itel. These packages include routines that support the use of 370 instructions on 360 gear, a sort that handles fixed-length records very quickly [CW, April 30] and a conversational text editing and remote job entry programming system called Prepso [CW, Jan. 1].

Similarly, no one at Advanced Systems Corp. has made any announcement about the microcoded changes Itel made in IBM's 370s.

Based on hardware from Four-Phase Systems, Inc. and driven by software from Softlab GmbH of Munich, Maestro supports all phases of the program development cycle, from problem definition and program planning through documentation and coding.

Control and evaluation of program compilation and testing on a mainframe attached to the Maestro processor are also parts of the system. Maestro can support APL, Cabannis said.

In addition, the number of terminals that can be attached to and supported concurrently by the processor has been doubled to 20, with 24 as a final upper limit.

The additional terminals can be supported in large part because Four-Phase has extended the amount of main memory that can be included in the processor it provides as the heart of Maestro. The software had to be changed somewhat to control the heavier work load, Cabannis added.

Support for more Maestro terminals was not the only enhancement included in the revised software. Backing for IBM 3780 emulation is there, too, and that means the user can now follow the development cycle into the maintenance phase.

The programmer can switch from the Maestro mode to the 3780 mode dynamically. With that flexibility, he can exercise a program — in 3780 mode — until he sees where it runs into problems and then flip to the Maestro mode to revise the source code and run the code through compilation and back into the test phase.

A complete 20-terminal Maestro system costs $260,000. That compares with a price of $206,000 for the original 10-station system.

Sales and technical support offices will be established as the market for the product grows, Cabannis said. Meanwhile, the nucleus of Maestro Systems is at One Embaracadero Center, San Francisco, Calif. 94111.

Burroughs Adds to B900s

(Continued from Page 1)

channels, up to three disk controllers and a maximum of four data communications channels. The second 90 series model also features a 120 char./sec printer with adjustable densities of 10- and 16 char./in., the spokesman noted.

The B90's processor has a 2 MHz cycle time and employs a variable micrologic design that reportedly allows the machine to alter its operating logic to fit the particular requirements of the processing task.

Communications Capabilities

Data communications are performed in asynchronous, synchronous or bi-synchronous modes and can accommodate leased, switched or two-wire direct connect lines, the spokesman said. In addition, the units incorporate a Network Definition Language (NDL) compiler for implementing or reconfiguring a data communications network and a message processing language compiler for interfacing user programs to the NDL and for providing an extra level of message control.

Software includes a master control program that governs system operation and allows for expanded virtual memory and a variety of on-board compilers for high-level language programming

Users may choose from five disk storage options, which may be used singly or in combination and can deliver up to 46.8M bytes of on-line data storage.

Purchase prices for the B91 system with 128K bytes of main memory and the 6M-byte Mini-Disk storage media start at $17,950, while prices for the B92 with equivalent memory and storage begin at $20,708. Lease rates for the two systems start at $683/mo and $775/mo, respectively.

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ADR's DATACOM/DB and DC speed online claims processing for Blue Cross of Idaho.

Programmers productive virtually overnight.

DATACOM/DC selected over six packages.
"Early in 1976, we determined that the teleprocessing package we were using couldn't support our future development plans," explained Gary Dyer, Director of Systems and Data Processing, Blue Cross of Idaho Health Service, Inc. "We developed a questionnaire based on our requirements and sent it to seven companies that had at least a DOS and OS version of their monitor. The finalists were TASK/MASTER, CICS, and DATACOM/DC."

Larry B. Shaw, Manager of Systems Support, noted, "We had the three systems installed and each company conducted a class on its use. We selected DATACOM/DC for four reasons: ease of use, comments from other users, data base interface, and a feeling of commitment and expertise on the part of the ADR people."

Programmers productive virtually overnight.
"Our system support and development staff attended a one-week class," Mr. Dyer continued. "They were all writing online programs at the end of the session, even though most had had no previous TP experience. I still find this hard to believe!"

Conversion in twelve weeks.
"The conversion was accomplished by application programmers newly trained in online technology. We had 15 CRTs installed using 5 applications, 22 Message Processing Programs (MPP's) and processing about 6,000 messages per day. Today, we're supporting 32 CRT units with 25 applications online and 200 application MPP's. We have immediate access to all our major master files and have CRTs in every functional area in the corporation."

Performance standards up.
"The National Blue Cross and Blue Shield Associations monitor the performance of their member plans with a set of national standards," Mr. Dyer went on. "During the last rating period we met or exceeded 100% of all the standards. This is due in part to the immediate accessibility of data made possible by DATACOM/DB and DC."

DATACOM/DB solves storage and access problem.
"A year ago we were in the initial design phase of a project to permit total payment of a subscriber's claim by computer. Because an enormous amount of information is involved, we needed an efficient way to store and access such data. This, plus our growing inventory of online files, made us realize we had to plan for future needs in data management. The selection of DATACOM/DB was not difficult to make. We presently have 5 data base files online in production and are moving ahead with 63 files in a test mode defined for our claims adjudication system."

Thorough training by ADR.
"We had an excellent training course. Our programmers learned the data base commands very quickly, and the training was excellent."

A good decision.
"We have never regretted our decision to go with ADR," Mr. Dyer concluded. "In fact, the more experience we have with the packages, the better our decision appears to have been."

Blue Cross of Idaho Health Service, Inc., Boise, Idaho, is the largest health care carrier in the state with a yearly claims payment volume in excess of $75 million. It has 80,000 subscribers, serves up to 270,000 individuals yearly and processes some 9,000 claims a week. The company's EDP organization, staffed by 24 people, supports claims processing, membership and billing services, corporate accounting, marketing and statistical/actuarial operations. The company operates an IBM 370/135.

ADR. The leader in Datapro Software Awards 1977 and 1978 for IBM 360/370 products. Over 10,000 products installed.

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Action a First for Canadian Facility

Strike Nets Wage Hike, Security for B.C. DPers

By Marguerite Zientara
CW Staff

VICTORIA, B.C. — DP workers at British Columbia Systems Corp. (BCSC), Canada's largest unionized computer facility, ended a 37-hour strike 10 days ago after successfully negotiating for higher wages and more job security.

In the first strike action ever against a unionized Canadian computer facility, 360 members of Local 67 of the B.C. Government Employees' Union — including programmers, operators and clerical staff — walked off their jobs at one minute after midnight, Wednesday, Sept. 26.

After an all-night bargaining session Wednesday night and two ratification meetings on Thursday, BCSC management granted the union all its demands in what BCSC spokesman Ross Cameron termed a "dissatisfactory" settlement.

Union members, however, were "delighted and ecstatic," according to Communications Officer Robbie Robinson. Calling the settlement a "complete capitulation" by management, Robinson noted the strike was "100% effective," in that every worker at the facility walked off his job.

The "privatized" BCSC is a Crown corporation that was originally set up with personnel from various government agencies as well as civilian workers. The corporation is provincially funded and operates under legislation different from that of the other provincial government agencies, although BCSC employees are considered government workers, Robinson explained.

"The problem stemmed [in part] from the corporation's apparent unwillingness to offer workers a wage package comparable to one that was recently negotiated for the 40,000 other public employees in this province," Robinson said.

The union's contract demands, according to Robinson, were exactly the same as those recently negotiated for the 40,000 other government workers in the province.

In addition, the union felt that because many of the BCSC workers were originally transferred from regular government service to set up the corporation, they should be entitled to comparable salaries and benefits. Another major problem lay in the fact that the corporation wanted to delete a contract clause stating that once a worker has completed two years of employment, he can never be laid off, regardless of what happens.

"If [a] job becomes redundant, if the economy collapses, the corporation still must carry [a worker] until such time as [he] retire[s]," Cameron noted. Management had held that the clause was "inappropriate" because the corporation is "bound to a profit-and-loss statement."

Under the terms of the settlement, the corporation kept the clause and lost a bid to "grandfather" it so that all present employees would be covered, but all new employees would not, Cameron noted.

From the union's point of view, however, the cancellation of that clause would have meant cancellation of job security, "and we can't let that happen," Robinson said prior to the strike action.

The strikers' intent was to "take down programs that we [felt would] not directly affect the general public, but [would] make enough people in society upset enough to put pressure on the government to settle this thing," Robinson said.

Also included in the shutdown plan was British Columbia Resource Corp., a government program on the open stock market that allows citizens to buy stock in the province.

And while BCSC management continued running all programs during the 37-hour period, Cameron said, the strikers had planned to shut down indefinitely such programs as mortgage recordkeeping for the province, Medicare payments to doctors, the entire government payroll, B.C.'s ferry system payroll, sales tax records, all government accounts receivable and payable and all forestry records, he said.

A special team of eight union member computer operators had been appointed to run a number of "essential services," but was never called upon to act because of the brevity of the strike. The services considered essential included the issuing of checks to welfare recipients and retired public employees, cancer laboratory biopsies, the issuing of guaranteed annual income checks to the needy and shelter aid programs for elderly renters, according to Robinson.

The strike action took place at BCSC headquarters in Victoria and in a smaller office in Vancouver that handles the stock market operation.

BCSC operates an IBM 3033, two IBM 360/145s and a Honeywell, Inc. 6660 and 6640.

Earlier Delivery for 4341s?

WHITE, PLAINS N.Y. — In order to answer users' complaints about long delivery times on the 4341, IBM is going outside the company to buy memory chips for the system.

IBM last week said it was "too early to say" how much the delivery schedules will be moved up and added that users will be notified individually about the new delivery dates for the systems.

In order to accomplish this, however, IBM will have to back-step on the technology used in the systems, using 16K memory chips from independents as well as the 64K memory chips it is producing in-house.

It is believed that IBM is buying the 16K chips from Intel Corp., among others, although IBM refused to comment on its outside suppliers last week.

IBM will ship systems that use both 64K chips and 16K chips, the firm said, and added that there will be no performance differences with the 16K chip machines. The 4341 will meet all original specs, the firm added, no matter which chips are used in the construction.

The 4341 will not be affected by the move, the firm said.

The move raised questions about IBM's ability to produce the 64K chips, which are being made at a super-modern, computer controlled plant in Burlington, Vt. However, IBM said the plant was working at scheduled production runs and not facing any problems.

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IBM Seen Violating Decree

(Continued from Page 1)

the government filed against the firm in 1951. While it is not an admission of any wrongdoing or guilt on the part of IBM, in it IBM agreed to refrain from certain actions.

Consent decrees between the government and others are enforced by the Enforcement Division of the Department of Justice which can bring a firm into court for violations of such decrees.

One of the major thrusts of the 1956 Consent Decree was to require IBM to make its computers and other DP equipment available to purchasers on the same terms as to lessees.

That provision of the Consent Decree allowed the founding of the third-party leasing market and the used equipment market, Benton said.

The new trade-in policy violates this nondiscrimination clause in the decree, the CLA/CDA charged, because it applies only to those existing lessees of IBM machines that leased from IBM during a limited period.

"This discriminates against those purchasers of these computer who purchased prior to that period," the organizations charged.

"To this extent, the IBM trade-in policy is unlawful under the Consent Decree and should be abolished or altered to make it available to all who presently own" 158, 148 and 138 systems, "whether or not they previously leased such machines from IBM," the position paper said.

In addition, the 1956 decree prohibits IBM from engaging in "tie-in" sales of equipment, whereby the sale or lease of one machine is conditioned upon the sale or lease of another, separate system, the paper pointed out.

With the new policy, users only gain the trade-in credits if they purchase or lease another IBM system in the 1980-1981 time frame. The trade-in credits are not given in cash, but are deducted from the price of the newer system.

"Thus a user currently leasing from IBM is effectively locked into purchasing the machine if he is contemplating buying a new IBM machine."

Users Told to Join in Policymaking

By Jeffry Beeler
CW West Coast Bureau

SAN DIEGO — Users should involve themselves fully in government deliberations affecting the data communications field, according to the former chairman of the Federal Communications Commission (FCC), Richard Wiley.

Federal policy decisions will play a major role in determining the types of products and services available to communications users in the coming years, Wiley said at the recent Telecommunications Association (TCA) conference here. Users can best protect their interest, therefore, by joining telecommunications policy debates at their outset when the chances of affecting their course are relatively good.

"You should not limit yourself simply to reacting to the marketplace as it presents itself from day to day," said Wiley, now a partner in Kirkland & Ellis, a Washington, D.C., law firm. "You should try to influence the environment in which the marketplace develops so that future innovations will be beneficial to you."

Speaking to TCA conference attendees in his keynote address, Wiley urged deregulation of and increased competition in the data communications industry. Open market policies adopted during the last 10 years at the federal level have given vendors a continuing incentive to meet new and even unperceived user needs and have resulted in a widely "varying menu of transmission speeds, qualities, prices and techniques," he said.

Top-Level Support

Support for a competitive communications industry has come from the highest echelons of government, including the White House, which only late last month endorsed two rewrites of the Communications Act of 1934 that called for relaxed federal regulations, Wiley noted.

Despite the high-level endorsement, however, he voiced grave doubts that the two rewrites will pass Congress any time during the next year. Between now and the 1980 election, he explained, legislators are likely to defer action on relatively obscure matters like telecommunications policy so they can devote their full attention to politically explosive issues like inflation and the energy crisis.

Calls for a deregulated communications industry have also come from the FCC, which recently issued a tentative decision on the Second Computer Inquiry it initiated three years ago, Wiley reported. Under the commission's decision, only resale carriers can provide computer-enhanced nonvoice communications.

The decision restricts "underlying" carriers — those that own their own transmission facilities — to the voice and other noncomputer-based segments of the communications market. Underlying carriers that wish to supply computer-enhanced services must do so through a separate subsidiary.

Although Wiley praised the FCC's decision as "basically a good one," he expressed fears that it might unwittingly invite a dominant carrier like AT&T to use revenues from the monopoly side of its business to unfairly subsidize its ventures in the open market. The commission could prevent such abuse, by compelling dominant carriers to meet stricter standards of separation than their less dominant counterparts.

Imminent Offerings

In other remarks, the former FCC chief predicted the imminent emergency of a flood of new data communications products and services that will revolutionize modern business DP practices. Word processing systems "far more sophisticated than anything we have today" will become office commonplaces during the 1980s, as will personal computers, which will number in the millions, Wiley predicted.

"And the present-day secretary will be augmented or perhaps even replaced by the technician of the future who can operate these new lines of office equipment," he added.

Most of the upcoming offerings will stress a systemwide approach in which nearly every piece of office equipment will be able to communicate "in one way or another" with every other piece, Wiley said.

Failure to keep pace with the quickening advance of telecommunications technology could put a user at a "substantial competitive disadvantage," the speaker noted. On the other hand, the lack of adequate standards will continue to limit users' ability to "talk" to one another and could force customers who bet on the wrong standards to lose their entire communications investment.

IBM Speeds Securities Sale

NEW YORK — In a surprise move, IBM made its $1 billion offering of new debt securities last week instead of waiting until the middle of the month, as originally planned [CW, Oct. 1].

Although the firm would not comment on its reasons for moving up the date of the sale, industry watchers noted IBM's move came at a time when expectations of government measures to boost the dollar spurred the most active trading in Treasury bill futures since last November, when President Carter announced a dollar support program.

The IBM offering was for $500 million in seven-year notes and an equal amount in 25-year debentures.

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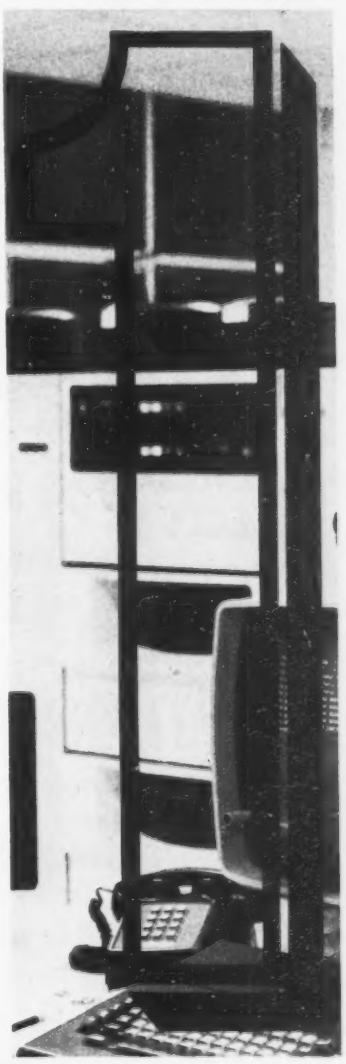

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AT&T Disputes Views on Separate Subsidiaries

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — AT&T, while agreeing that the 1956 consent decree, as presently interpreted, bars it from offering enhanced nonvoice services, disagreed sharply with almost all of the other comments submitted by industry spokesmen to the Federal Communications Commission's (FCC) Second Computer Inquiry last week.

AT&T insisted separate subsidiaries are not needed to prevent anticompetitive cross-subsidy of regulated services, but might be an acceptable way of separating regulated and unregulated offerings — provided certain other changes were also made.

"Structural separation might be useful, even necessary, to insulate regulated services . . . from unregulated services governed by the competitive marketplace. Under existing circumstances, however, where the Bell System continues under regulation in the provision of its services, including 'enhanced nonvoice' services, there is no need for insulation."

Elsewhere in its comments, AT&T elaborated on this point: Although the phone company "has publicly stated . . . that establishment of additional subsidiaries would be appropriate under certain circumstances, . . . these circumstances . . . contemplate legislative action to deregulate certain categories of service and, with consent decree relief, to permit participation by the Bell System in a broader and more diversified marketplace than that in which it now operates under regulation."

The FCC "wants to resolve what has been a very troublesome matter of accounting and service costing [by doing away with] the joint use of a plant. However, that approach would disserve the user public because the joint use of the same plant for more than one service is an economically efficient way of providing service and a fundamental underpinning of this nation's communications network," AT&T maintained.

Costs vs. Benefits

FCC Commissioner Joseph Fogarty "has highlighted the need to weigh the prospective costs of structural separation against the prospective benefits. AT&T [believes] that study and analysis of the implementation and transitional issues of any particular organizational change can be accomplished in a reasonable manner consistent with the Commission's objectives."

AT&T also felt the commission's final decision in the Computer Inquiry should "reflect the growing significance of nonvoice services and sophisticated customer premises equipment for residential users."

In other words, Bell apparently wants the commission to let underlying carriers offer an expanded range of terminal equipment. The tentative decision, as currently proposed, would limit such carriers to "basic media conversion devices," AT&T said.

AT&T Suggestions

AT&T made a number of other suggestions aimed at integrating services and/or equipment that the FCC decision attempts to separate.

Specifically, the phone company said that enhanced customer premise equipment — that is, computerized terminals — "should be tariffable if it has a communications purpose without regard to possible noncommunication uses," such as DP.

The FCC's final decision in the current computer inquiry "should not include a defined '[DP] service category' . . . exclusive of communications services," according to AT&T.

"The dividing line between basic and sophisticated equipment [should] be broad enough to include basic communications functions, in addition to media conversion, which traditionally have been provided to customers by carriers."

Assurances Needed

AT&T also said the FCC cannot deregulate carrier activities "unless the consent decree is interpreted by a court or modified to give assurance that Bell System operating telephone companies may pursue unregulated alternatives."

The phone company advised the commission to deregulate common carrier communication functions — and thus Bell would not be violating the decree by offering them. Otherwise, the FCC should "make it clear that appropriate modification to the decree is required and [such modification] should be supported by the government."

Industry Answers Second FCC Inquiry

(Continued from Page 1)

CCIA stated, adding that the FCC's reasons for modifying the decree would not stand up in court.

The Computer and Business Equipment Manufacturers Association (Cbema) came to basically the same conclusion: "In critical aspects, the tentative decision is at odds with its own general policy." A basic problem, Cbema said, is that the proposed decision allows a carrier's subsidiary, under regulation, to offer an "enhanced nonvoice service," including DP. But an unregulated noncarrier is limited to DP and thus would be at a disadvantage if it wanted to provide a competing service.

Cbema would solve this problem by having the FCC explicitly limit its regulatory authority to underlying carriers. Subsidiaries set up by AT&T and other such carriers for the provision of enhanced services would be totally unregulated under this scheme, but there would also have to be maximum separation between parent and subsidiary — separate officers, personnel, facilities and accounts, Cbema emphasized.

IBM Concurs

IBM, a Cbema member, also stressed the need to deregulate enhanced services. The company said that forcing underlying carriers to tariff services they provide to resale subsidiaries and requiring use of FCC-approved accounting procedures would protect unregulated suppliers against unfair competition from the carriers.

IBM said establishment of fully separated subsidiaries would "reduce the demands on the accounting system." (In the past, the company has said separation is unnecessary).

IBM opposed the tentative decision's technical definitions for such terms as "basic" and "enhanced" nonvoice services, contending they would "create regulatory uncertainty, constrain design options and distort business decisions . . . Marketplace forces . . . are bound to frustrate and quickly render obsolete any attempt to draw a regulatory boundary based on technical distinctions between communications and [DP] services . . . Deregulation of all activities other than pure transmission services . . . would make such definitions unnecessary."

Adapso Chimes In

The Association of Data Processing Service Organizations (Adapso) contended that many specialized carriers offering enhanced nonvoice services should be regulated along with underlying carriers such as AT&T. It agreed with CCIA, Cbema and others that maximum separation between carriers and their affiliates is necessary to prevent anticompetitive cross-subsidies and "tying arrangements," under which a customer is required to buy one service in order to get another.

CCIA, in its comments, proposed the same basic idea. The separation between General Telephone and Electronics Corp. (GTE) and its Telenet Communications Corp. subsidiary, for example, could be less than that between AT&T and a similar subsidiary. CCIA also endorsed language, already in the tentative decision, that would exempt small telephone companies from the separate subsidiary rule.

Resale common carriers affiliated with AT&T and other major carriers should be required to tariff separately the communications component of their enhanced nonvoice services, Adapso added. "This is necessary to assure that basic communications 'building blocks' are not transferred from underlying carriers to their resale affiliates or otherwise made unavailable to competing suppliers."

Adapso severely criticized the FCC's interpretation of AT&T'S consent decree: "Notwithstanding the commission's efforts to construe the decree differently, AT&T may not offer communications services unless they are subject to regulation, nor may it offer [DP] services as an 'incidental' business or service.

"Were the commission's interpretation of the decree to be adopted, there would be virtually no limits on the scope of AT&T's permissable activities.

GTE argued that it should not be barred from offering enhanced nonvoice services or terminals directly, because this would deny some prospective users, such as those in rural areas, the benefit of new technology.

GTE's key point seemed to be that the separate subsidiaries approach isn't feasible in GTE service areas and isn't necessary given the company's size.

Limiting GTE telephone companies to basic media conversion equipment "would also prevent them from offering equipment which provides a variety of on-premises information processing functions, or which incorporates information processing capabilities," the company added.

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Balloon Lands South of Mini-Plotted Course

By Tim Scannell
CW Staff

SPENCERVILLE, Ohio — After drifting far south of their computer-plotted course on winds that carried them deep into America's heartland, four balloonists landed with a thud here last week — less than 40 miles short of their intended goal.

Having survived everything from subfreezing temperatures to 15,000-ft. mountain peaks, the DaVinci Transamerica was finally stopped by severe thunderstorms and high-altitude snow, which dragged the 8,000-lb. balloon to the ground. However, throughout the 2,500-mile six-day journey, the balloonists were in nearly constant communication with an environmental forecasting company in Bedford, Mass., that used a minicomputer to map the original route and provided hourly weather updates when the balloon blew off course.

As the craft sailed erratically eastward, the staff of Weather Services Corp. compared its flight progress with data output by the firm's in-house Digital Equipment Corp. PDP-11/34. According to senior meteorologist Jim Serna, the minicomputer contains digitized base weather maps of every portion of the U.S., as well as information on various parts of the globe.

In addition, staff members are able to tap — via the mini, some high- and low-speed communications lines and about 10 CRT terminals — such sources as the National Weather Service (NWS), the World Meteorological Organization and the Federal Aviation Administration (FAA).

Using this system, forecasters at the firm can call up "any and all parts of the computer programming and maps and so forth," Serna continued. Moreover, "weather can be monitored around the world."

Besides forecasting what kinds of weather the balloonists might have encountered as they traversed the country, the Bedford firm also used its 124K-word mini to run trajectory forecasts with NWS data that gave an indication of what paths the DaVinci Transamerica might have taken.

For instance, if the craft had glided into a thermal layer, the 216,000 cubic feet of helium in the balloon's sack could have heated up and expanded, causing the structure to rise into fast upper-air wind currents. The DEC computer was used to plot where these currents were and where they would carry the balloon and its passengers.

Cold weather fronts and down drafts were also monitored through the computer, since either one could have forced the balloon to make a sudden and perhaps hazardous drop in altitude, Serna pointed out.

Even though Weather Services has plotted the courses for every major balloon excursion since late 1976, its forecasting abilities are not reserved for lighter-than-air clients. Customers of the firm include a number of radio and television stations across the country, including NBC television and its early-morning "Today" show. Several stockbrokers and grain dealers also employ the company to supply weather data for commodities dealings.

Meanwhile, the four crew members of the DaVinci Transamerica — pilot Vera Simons, environmental scientist Dr. Rudolph J. Engelmann, radio expert Dr. Fred Hyde and NBC television cameraman Randy Birch — are planning to attempt the 2,295-mile flight again sometime in the future.

DP Illiteracy Found Common

(Continued from Page 1)

truly reflects the importance of employee training, Kapur cited IBM, which is said to spend 10% of its annual profits on in-house education.

Many users intentionally skimp on their training expenditures, Kapur theorized, because they fear increased competence will encourage their employees to seek better jobs elsewhere. But whatever the reason for the neglect, a shortage of staff training can — and does — seriously impair a DP center's effectiveness as well as a programmer's competence, Kapur said.

To support his contention, the consulting company president cited the results of a recent survey that showed only 26 programmers in a sample of 250 had received any meaningful on-the-job training in program debugging and testing. The same study also reportedly revealed only 16 members of the sample had had instruction in Cobol efficiency methods and only 18 had had instruction in documentation.

In another survey involving 13 DP installations, Kapur purportedly found most users have never devised standard patterns for writing code or creating program diagrams.

As a part of the study, a group of programmers was given the routine task of updating a sequential file.

Many of the seasoned veterans in the survey group took just as long to complete the chore and made just as many errors as the relatively inexperienced programmers, Kapur said. Follow-up studies have reportedly yielded identical results.

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SSI System Blamed for $25 Million Error

By Ann Dooley
CW Staff

BALTIMORE, Md. — More than $25 million in excess benefits have been paid to Supplemental Security Income (SSI) recipients because of weaknesses inherent in the Social Security Administration's (SSA) SSI computer system, according to federal auditors.

Many system controls do not function properly, and most problems date back as far as 1974, when the SSI program was first implemented, according to a General Accounting Office (GAO) report that documents the control flaws in the SSI computer system.

During the nearly 5,000 test transactions processed by the GAO between April 1977 and September 1978 more than 25% of the SSI system exception controls failed to function properly. GAO auditors also noted that payment errors might even exceed the $25-million mark if cases processed before testing began are considered.

SSA officials contend, however, that the $25 million figure is misleading and stated that, with a pay plan totaling $29 billion over the last five years, the $25 million represents less than 1% in overpayments and amounts to a .08% error rate. In addition, the $25 million was not necessarily paid out to recipients, an SSA official claimed. Manual checks would have resulted in a decrease in the payments.

The SSA "will work with the GAO and continue to make improvements," an SSA official said. More than 550 changes have been implemented since the end of the GAO study.

The SSA contends that many of the errors were the result of project changes that took effect after the programming had begun. Much of the information obtained from state and local government agencies on the three million cases was faulty or lacked Social Security numbers, and therefore a lot of inaccurate information had to be cleared up at the program's inception, the spokesman said. Moreover, only 14 months were allowed for the programming and implementation effort — a very short time for such a complex system, officials claimed.

'Resurrection' Possible

But in addition to the usual implementation problems found in large and complex systems, the GAO found problems that are continuing to produce overpayment errors today.

The system allows operators to "resurrect a deceased case" and order monthly benefits of $189 paid to the dead recipient, GAO auditors found. The system's automated controls can also be overridden to compute benefits of up to $2,000 a month, or nearly $1,800 more than the legal limits for an individual, the GAO charged.

After testing the system, the GAO made the following observations:

- The automated exception control process, designed to ensure system accuracy, does not always work. Inaccurate data can be entered and used to compute payment amounts.
- Instructions concerning the appropriate action needed to correct inaccurate data are inconsistent.
- Field office personnel can override many of the system's controls, thus allowing incorrect or incomplete data to be entered and processed.

The GAO estimated about $20 million in erroneous payments occurred because of inadequate controls for determining payments in the automated data exchange between the SSI computer system and the Retirement, Survivors and Disability Insurance (RSDI) system.

The GAO said the improper payments occurred because:

- Verification of identifying data can be overridden by field office personnel or bypassed automatically by the system if verification is not performed in a timely manner. Erroneous payments amounting to $6.4 million were made in this way.
- SSI payments depend on the manual verification of previous RSDI payments by field office personnel, because complete data is not programmed into the system. Incorrect payments totaling $6.4 million are said to have resulted from this.
- Complete RSDI information is not always exchanged on claimants who file for both sets of benefits concurrently. Incorrect payments of $7.2 million were attributed to this failure to cross-check.

The GAO recommended that the SSA improve controls over the SSI programs by:

- Correcting deficient exception controls, especially for income and resources, which directly affect eligibility and payment amounts.
- Improving the documentation of the system's exception control process at the field-office level.
- Restricting the system override capability to supervisory personnel who have the authority to make the override decisions.
- Removing the data exchange override capability and the "default on verification" provision from the system.
- Modifying the RSDI system to provide the SSI system with a complete payment history.
- Determining why field office personnel do not enter all eligibility decisions in the RSDI system and do not ensure the data is exchanged with the SSI system.
- Exchanging additional data such as recipient address and household composition to reduce potential.
- Removing the system limitations requiring the manual calculation and control of forced payment cases.
- Reviewing existing forced payment cases, verifying the accuracy of all payments made and returning cases not eligible for forced payment status to regular payment status.

IBM Unveils Color Unit

(Continued from Page 1)

the basic four-color range.

All four models of the 3279 can be used in clusters with all 3270 CRT and printer products, the spokesman said. As many as 32 of the 3287 color printers can be attached to existing IBM 3274 control units, and up to seven of them can be used with a single IBM 3276 control unit CRT station.

The 3279 is said to contain a color convergence system that ensures color definition. An operator can use the keyboard to align colors across the screen at points specified in a test pattern, the spokesman explained, adding that once converged, the station may require no readjustment for several months.

Available in 80- and 120 char./sec versions, the bidirectional 3287 color printer is intended for desktop use and reportedly has the same functions as current 3287s. A Programmed Symbol Feature allows the product to print additional user-created character sets.

To support the 3279, IBM released its Graphical Data Display Manager programming subsystem. An option of this subsystem called the Presentation Graphics Feature is said to facilitate the creation of pictures, images and marking or shading patterns.

Another feature of the subsystem, Business Graphics Routines, is said to allow users to enter data at the terminal and select from a menu of pictorial displays without writing special applications software, according to the spokesman. This expedites the creation of line graphs; bar, pie and surface charts; scatter plots; Venn diagrams; and histograms.

The 3279 software reportedly supports interactive use of most applications written in Fortran, PL/I, Cobol and 370 assembler as well as APL under IBM's Time Sharing Option and Conversational Monitor System.

Product Prices

The 3279 display station is priced in the $4,300 to $6,700 range, depending on the model selected. The station can be leased for $105/mo to $159/mo under a two-year plan or rented for $123/mo to $188/mo.

The 3287 color printer costs $6,125 and $6,500 for 80- and 120 char./sec operation, respectively. Under a two-year plan, the 80 char./sec version can be leased for $184/mo and the 120 char./sec version for $216/mo. Those versions can be rented for monthly fees of $216 and $254, respectively.

Monthly license fees for the Graphical Data Display Manager programming subsystem and the Presentation Graphics Features are $60 and $100, respectively.

Shipments for all these products are slated to begin in the second quarter of 1980.

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Two CPUs Destroyed, Two Damaged

Flooding of Census Bureau DP Room Probed

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The House of Representatives has launched an investigation into the cause and possible effects of the recent flooding of the Census Bureau's main computer room.

Concerned that damage to the bureau's four mainframes might affect the 1980 census, just getting under way, the House Subcommittee on Census and Population has asked the General Accounting Office (GAO) for a full report on the incident.

The accidental activation of the DP center's sprinkler heads, mismatched to the type of sprinkler system in use, caused the DP room to be flooded with several inches of water Aug. 8 [CW, Aug. 13]. The computer center, located in nearby Suitland, Md., contains more than $40 million in hardware.

According to Census officials, two Univac 1108s were completely destroyed. A third 1108 and one 1110 were damaged, but subsequently returned to service. No peripherals were damaged.

Until the center can be restored to its original operating capacity, some of its work has been off-loaded to other government DP facilities and commercial service bureaus. The Census Bureau has not yet compiled an estimate for the cost of these services.

Effect on Census?

The House panel requested the GAO investigation because Congress will have to appropriate the money to replace the irreparable 1108s and because of "a very real fear" that the accident might affect tabulation of incoming census data, according to subcommittee staff director Michael Ferrell.

To replace the damaged equipment, the bureau has already ordered on lease a Univac 1100/83 mainframe which carries a price tag of about $7 million, bureau spokesman Maury Cagle said. The new machine, to be delivered today, is expected to be operational by mid-October.

This schedule ensures the 1980 census will not be adversely affected by the accident because tabulations are not slated for input before April, Cagle added.

Management Tight-Lipped

DP management at Census is being very tight-lipped about the cause of the accident, refusing to speculate until an internal study is completed by the Inspector General's office of the Department of Commerce, of which the Census Bureau is part. This study is in addition to the GAO investigation.

However, according to several government sources, the sprinkler system may have been activated when an employee accidentally hit a fire alarm. Ferrell said he is discounting that possibility because the alarms in the center are activated by a pull switch and could not have been hit by mistake.

The cause of the accident "is something that's still subject to investigation," he said.

Wrong Heads

What is known is that the sprinkler heads that caused the damage were not the correct models for the center's plumbing system.

The DP center was outfitted with a "dry-type" sprinkler system in 1976, according to Jim Hawkins, chief of the Accident and Fire Prevention Branch of the General Services Administration's (GSA) National Capital Region. With this type system, the pipes remain empty until the alarm is pulled.

'On-Off' Heads

Sometime in 1977, at the request of the Census Bureau's DP department, GSA replaced the sprinkler heads with "on-off" heads, which are designed for a full, pressurized plumbing system. The heads rely on water pressure to remain shut until activated by heat. They then shut off automatically when the fire is under control, Hawkins explained.

When the fire alarm was pulled at the DP center Aug. 8, a valve opened, flooding the sprinkler pipes and causing the heads to leak until sufficient water pressure had built up to close them.

According to GSA officials, 64 of the 85 heads in the DP room leaked at various rates for two or three minutes, releasing up to 500 gallons of water. The heads have since been replaced with the correct model and the system has been tested and found satisfactory, according to the center's building manager.

Discussing the installation of the improper heads, Hawkins said, "Let's put it this way . . . it wasn't a good thing to do. It was ill-advised — simple lack of knowledge. The proper people weren't consulted [as to] whether it was a good idea or a bad idea."

Hearing Likely

The installation of those heads will presumably figure prominently in the final reports of the GAO and Commerce Department investigations.

Once the reports are completed, the House subcommittee will probably schedule a hearing on the accident, Ferrell said.

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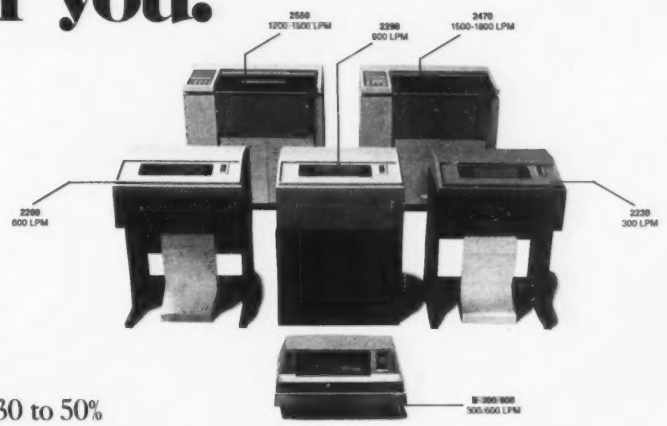

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Report Seen Stirring 'Passionate Controversy'

By Rex Malik
Special to CW

LONDON — If the President of the French Republic wanted to make the public sensitive to "Informatics and Society," that end has been reached and perhaps exceeded. If he wanted to reach a consensus, he is not at the end of the way. The publication of this report has raised passionate controversy — and not only in France.

This was the view expressed by Andre Danzin at Euro Ifip 79 here recently. Danzin is the director of IRIA, the key French national research center for computing and telecommunications funded by the French government.

Danzin emphasized he spoke only for himself — and after the talk one could understand why.

CW at Euro Ifip 79

The report he was discussing is commonly called the Nora Report, though its full title is "The Informatization of Society." The report — really the Nora-Minc report — is the work of two senior French civil servants, who at the behest of President Valery Giscard D'Estaing took a year off to investigate what might happen to society if widespread computing was introduced.

The results of the report were controversial enough to ensure a best-seller in France and the translation of the report into many languages, including English and Japanese.

Nora and Minc were the inventors of the word "Telematique," which is rapidly being absorbed into the languages of Europe. It refers to the marriage of computing and communications on a mass-market scale. It has unfortunately focused attention on what happens when the two technologies come together at the expense of other developments, notably minis and micros, according to Danzin.

"The preoccupation with unemployment has also focused the attention [of the reader of the report] on the decrease in job places resulting from the increase in productivity brought about by computers. This focusing on one of the most sensitive aspects of the social problem has again deformed the understanding of the report's meaning," he added.

Preparing the Citizenry

When the report first appeared last year, it was criticized for suffering from some important omissions, one of which was the failure to discuss how France should go about preparing its people for life in a computer-oriented society. The subject is evoked rather than covered, Danzin said.

So the French government made a rapid decision to equip some of its schools with 10,000 minicomputer systems to "initiate the pupils in the handling of computers, terminals, languages and programming." Officials believe this will help prepare young people and their parents for the situation that is evolving.

(A recent announcement in Paris indicated 130 such systems had already been installed. The French are working very fast indeed; at the official level, at least, they do not seem to think there is much time.)

At Ifip, however, Danzin pointed out that the most emotional discussion has concerned the invention of the word "Telematique." "This is felt by some to symbolize the traditional centralized policy in force in French government

(Continued on Page 11)

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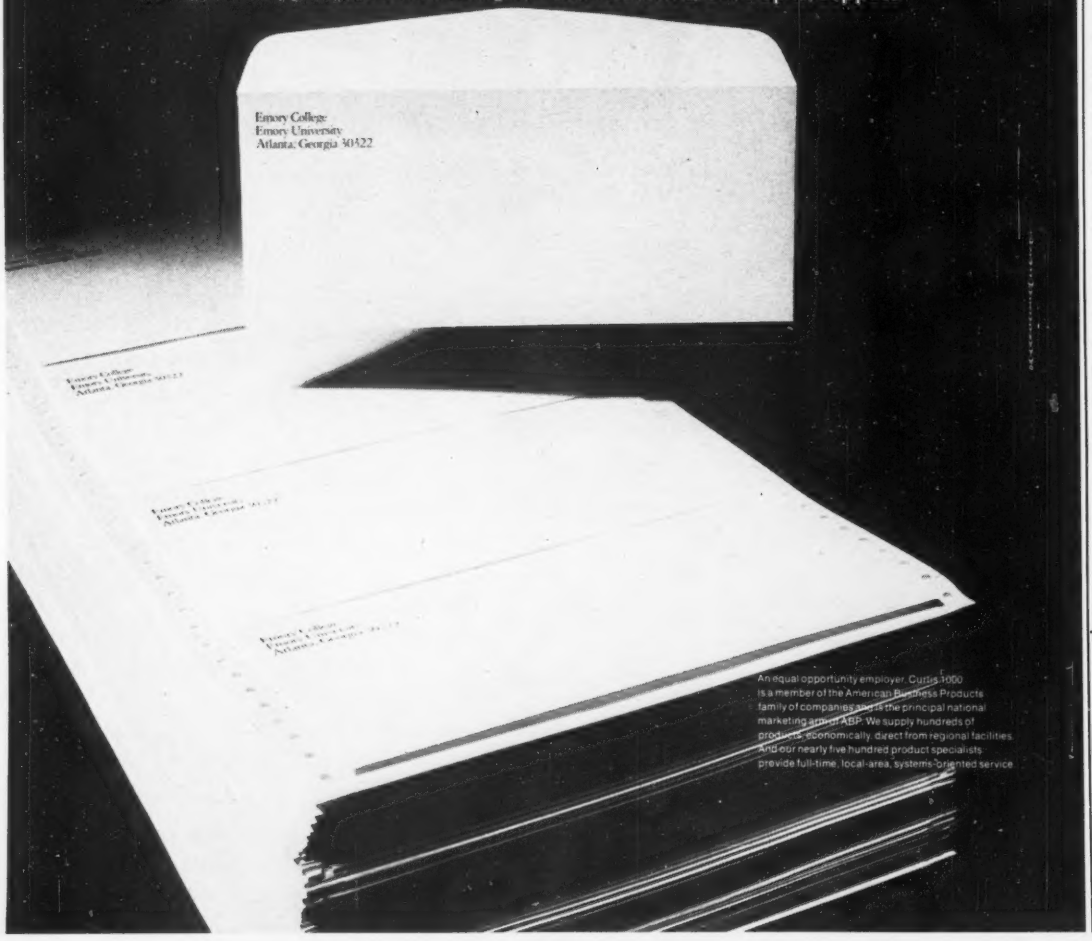

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Contract With Children Unfulfilled?

Education Not Keeping Up With Technology?

By Rex Malik
Special to CW

LONDON — What is the contract between the child and society? It is that, "in return for requiring the child to study the subjects society considers useful and in return for requiring him to pass the appropriate examinations, society will see to it that there are enough jobs available to the former child when he goes to obtain one and take his place in the outside world."

It is not a bad definition, and what is more, was one that seemed to meet with general agreement at a well-attended discussion on what we should teach our children for tomorrow. The forum was a session at Euro Ifip 79 here recently.

The discussion was led by four professional educators, among them the head of the London school system, D.M. Esterson, and David Tinsley, the chief school inspector in Birmingham, the UK's second-largest city.

The ultimate users, the children, were absent. But they were well spoken for by a hall packed with computing professionals, most of whom seemed to have children at school and all of whom showed some concern about the inability of the school system to note, reflect and take advantage of the changes that computing technology is bringing about in society.

Discussions are notoriously difficult to summarize, but one comment worthy of note concerned the "problem of hierarchy."

Most industrial countries are in the same fix, the speaker said. The majority of teachers are unacquainted with the changes brought about by information technology or are unaware of or out of sympathy with the social consequences."

"Teaching obsolete skills gets in the way of teaching new ones," someone said.

And another asked, "What is the nub of the question? It is: What are we going to teach our children for?

"But how can we teach them properly when we recognize we are bound for massive change, but have two distinct visions of that change before us? One [vision] states that we are bound for a discontinuity; that the work society will become the leisure society.

"The other states that we are still bound for work, but that it will be different and that there will be few 'lifetime skills.' These are different visions of the near future, and they lead to different teaching requirements."

Still another question raised was, "Can we afford decentralized education any longer, or does there have to be some sort of centralized direction to make sure that in a time of change, some children do not suffer because they are not getting the education they will need? And why are they not getting it? Because of the lack of recognition of the importance of change in their area."

CW at Euro Ifip 79

And another said, "Studies of history, economics, sociology and science based on assumptions of linear growth of systems and knowledge are likely to be falsified by modern events in information technology. These events appear to point to a discontinuity, or quantum leap, in the conception of human progress. How far does this need to be recognized in general philosophies of curriculum planning?"

And yet another: "No one can predict any longer how many people will be required to run society or what they will do."

And another: "The traditional literacy base of initial teacher education [in the hands of those who were themselves educated 30 to 40 years ago, before the information technology revolution started] is inadequate to modern purposes."

Some participants offered suggestions for resolving the dilemma. "What we need to do is extend courses that deal with the man-machine interface. That would be more useful than much of what we do now."

From someone else, "There is a need for public computer facilities, just like public libraries, which the citizen can visit or otherwise access."

The last word, however, should go to the speaker who, commenting on the present situation, asked, "How can we say to our children, 'I'm now going to teach a course that will make most of you unemployable'?"

Iria Director Discusses Aftermath of Nora Report

(Continued from Page 10)

administration and French companies.

"As a result, the distributed computing approach has found strong supporters. One [supporter] has created the word 'privatique' to contrast with telematique, using it to mean polycentric, human and decentralized," Danzin said.

He pointed out that the report has highlighted the connection between informatics and employment. "It is," he said, "an extremely sensitive point in France.

"The Nora-Minc report gives the figure of a 30% reduction in bank and insurance employees — and more generally, office employment — over the next 10 years, with no fall in the work done. This figure has certainly contributed to the study for new solutions in employment and it has boosted the Trade Union claims for a 35-hour working week."

Where will it all end?

According to Danzin, "There is a new hope for society that the systematic shortening of the working day will leave free time that will allow man to fulfill himself through self-improvement and self-expression. The Nora-Minc report cautiously puts forward this notion of a birth of a dual society comprising of paid work and personal leisure activities."

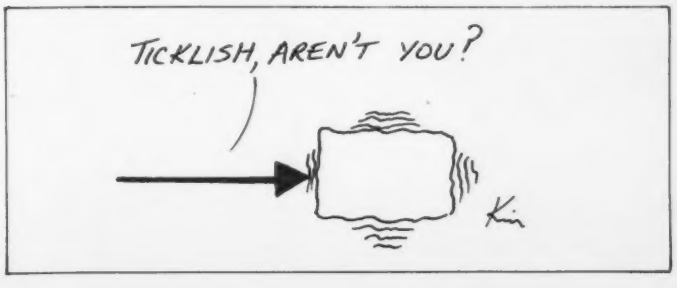
Galvanizing Opinion

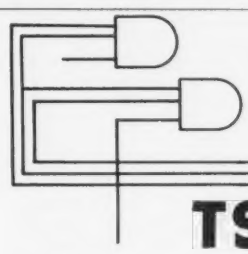
Danzin pointed out the report had done a considerable amount to galvanize government opinion in Europe as well as in France. The European Commission now has several commissions studying aspects of the computerization of society, and concerted steps have been taken in West Germany to look at the impact of the technology.

"Today's European [or Western] standard of life can only be preserved if it is based on two conditions," Danzin stated.

These conditions are "one, that the European countries sustain their technological superiority — though we know this is going to be increasingly difficult; and two, that the European countries lead human society toward new models of production and consumption in which the low cost of labor will no longer be a major economic factor.

"Then will come a new level of stability," Danzin concluded.





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Viewdata Seen Promoting Software Distribution

By Rex Malik
Special to CW

LONDON — "How are we going to get software distributed to the end user in this era of cheap hardware and micro technology?

"Viewdata [the mass market, on-line television and telephone-based information retrieval technology system that has been launched by the British Post Office under the name Prestel] has come along at the right time.

"What is Viewdata technology? It is a communications system. But there is no reason a terminal should be a dumb television set."

This was the view expressed by Alex D'Agapayeff, chairman of Computer Analysts and Programmers, Computer Programmers and Products (CAP CPP), a British software house, in one of the main papers given at Euro Ifip '79. The software house is known for developing Micro Cobol, the machine-independent language for micro-based systems.

CW at Euro Ifip 79

After reaching an agreement with Insac Group, the Viewdata systems and software export house, General Telephone and Electronics Corp. undertook the study of Prestel in the U.S.

"I think the following is the way mail-order houses will distribute some of their software. You will buy the initial version on diskettes, but will get your updates on-line. And you can then do on-line diagnostics, recognizing that in this marketplace, maintenance by traditional means will not be economic," D'Agapayeff said.

"Indeed, one can see a situation where the purchaser will be able to examine a number of software systems on-line before purchasing, enabling him to see which fits his requirements bets," he continued.

Protecting Investments

"How do we protect our investment in programs in this environment?" D'Agapayeff asked. "It is not difficult to make a program decay over time. It is not a fireproof method; there may be Prestel [Viewdata] freaks just as there are phone freaks. But it is a possible working method.

"Do not forget also that with many small financial application packages, the tax base and the taxes are constantly changing, so that software is not just a one-time thing," he said.

But are there not other and more traditional ways of protecting an investment in software? D'Agapayeff doubts it, and primarily for economic reasons. He pointed out that when you can buy compilers and application packages at anything from $10 to $99, the profit margins are small.

He sees immense opportunities, however. He quoted a survey, done by the University of Bradford, that looked at a large number of chief executives and found 89% of them did calculations on their own. Those sums could each take up to 15 minutes for 20% of those surveyed.

The executives were asked if they would use personal computers if such computers were inexpensive enough, and 75% said yes — if the right tool came along.

D'Agapayeff pointed out that the micro with a color CRT screen is likely to be as desirable in the office as color had been in the home.

"We shall be writing operating systems for audio; voice-over is a very powerful idea. And it's going to be a long time before you see that on mainframes," he said.

What's the weakest element in the microprocessor scene? The answer: compatibility. "There are currently 4,000 box constructors in the U.S."

D'Agapayeff believes that the advent of the micro with terminal — the 'box' — has radically changed the business DP scene. However, he did not deny the place of the mainframe or indicate that the two necessarily compete.

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Chug Fall Meet Set in Nashville

NASHVILLE, Tenn. — The Cooperative Health Care Users Group (Chug) will celebrate its 10th anniversary at its fall conference here Oct. 20-24. The conference theme is "Preparing for the Next Decade."

The international organization will present workshops and discussions for new and veteran users. Some of these include "Data Center Design Seminar," "Interactive Hospital Information Systems," "Patient Lookup Systems" and "Basic On-Line Support Systems."

More information on the conference is available from Stathis Alatis, Weirton Medical Center, Weirton, W. Va. 26062.

FORTRAN USERS WHO CARE ABOUT MONEY TURN TO PAGE 26

Bad News for U.S. Multinationals

UK Policies to Protect Local Computer Industry

By Rex Malik
Special to CW

LONDON — The changes in purchasing policy for publicly funded computer systems due to come into force in the UK and other Common Market countries in late 1980 are bad news for U.S. multinational firms over the short term. The same may be true even over the long term, according to a talk at Euro Ifip 79 here recently.

National preferential purchasing policies in the European Economic Community (EEC) officially come to an end on Dec. 31, 1980, according to W.R. Atkinson, head of the Computers, Systems and Electronics Division of the UK Department of Industry.

At that time the current exemption of computer equipment from the EEC Supplies Directive will expire. It is that directive which has allowed governments to obtain computer equipment without competitive bidding and to reserve as much as they wish of the public-funded market to nationally owned industries.

Last-Minute Safeguards

Working against the December 1980 deadline, the Commission of the EEC has for some years been attempting to formulate EEC plans for the European-owned computer industry that would help to support and protect it against non-European competition. This is in spite of the fact that manufacturers owned by non-Europeans may have substantial market bases within Europe and may contribute substantially to its exports.

"At least in the shorter term, I believe it will be necessary for each country to consider what needs to be done to safeguard the position of its own indigenous industry within the terms of international agreement," Atkinson said.

Such safeguarding continues to take place, right up to the deadline. In the UK, reports are circulating within the industry that indicate the protection policy is now being carried out with considerable ferocity.

Though no one will say which contracts are at stake or which manufacturers are bidding, at least two major publicly funded contracts have been fought through the Cabinet level.

The impression here is that because of a lack of an agreed, open policy in Europe, governments, including the UK, are taking what measures they can to increase the market share of locally owned manufacturers as quickly as possible before the existing preferential policies come to an end.

That does not mean that preference will be over even after the deadline, but rather that the successor policies have not yet been determined. Any notion, therefore, that the recent change of government and the switch to more open market policies might mean an end to local preference does not hold up under examination, Atkinson maintained.

Government policy and its bipartisan nature rest on four principles, Atkinson stated. They are: the need to exploit information technology in the name of progress; the importance of an indigenous manufacturing industry; vigorous competition within the industry; and government subsidy and purchase of equipment and services to stimulate competition.

"These principles have recognized that certainly in the phase of development and transition, the UK computer industry requires greater development than is likely to be available from private sources and that it is operating in a home market which is too small to allow for adequate development and in a world market distorted by the interventionist policies of other governments," Atkinson said.

Essentially, "this policy is similar to the policies of the main competitors of the UK — that is, the U.S., France, Germany and Japan. The governments of these countries have, for a number of years, also had programs of support for their indigenous computer industries, based partly on R&D investment and in part on official procurement preference — sometimes overt, and frequently covert," he added.

The direction in which the new UK policy will be shaped is already apparent, according to Atkinson.

"Industry will be supported by the carefully developed program of public purchasing consistent with the terms of international agreements. This must involve close contact between industry and user at a very early stage," he said.

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CW at Euro Ifip 79

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Campaign Readied to Champion Privacy Rules

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — The federal government is gearing up for a nationwide campaign to educate the business community on fair information practices for personnel records as recommended in just-completed guidelines on transborder data flow, Carter Administration officials said recently.

The voluntary guidelines, headed for adoption early next year by the Organization for Economic Cooperation and Development (OECD), essentially reflect the U.S. position that OECD members — primarily European countries plus major trading partners such as the U.S. and Japan — should refrain from hindering the free flow of computerized records [CW, Jan. 15].

European governments must be persuaded the U.S. is sincere in its desire to protect the confidentiality of such information if the guidelines are to effectively facilitate multinational business operations, according to William Fishman of the National Telecommunications and Information Administration (NTIA). To that end, NTIA and State Department representatives will travel around the country to address various industry groups and conventions on the specifics of the guidelines.

"In effect, the government is mounting a public relations campaign," Fishman told a recent meeting here of the State Department's Public Advisory Subcommittee on Transborder Data Flows.

"The Europeans at this point are waiting to see if we really are taking [the guidelines] seriously," Fishman told the Sept. 26 meeting. He sees this becoming especially important when the OECD takes up the next phase of its information policymaking agenda — the investigation of the legal and economic problems relating to the transborder flow of nonpersonal data.

These "follow-on activities," he said, will have a much greater effect on U.S. multinationals than possible restrictions on international transmission of personal records: "The bucks involved are probably two or three orders of magnitude greater."

Potential for Conflict

Developing the personal privacy guidelines was relatively simple since all OECD members are democratic countries with a shared desire to provide privacy protection for their citizens, Fishman said. Negotiating the guidelines was basically just a matter of working out the details, he explained.

But when it comes to nonpersonal information — business records and financial data, for example — there is "an enormous potential for economic conflict between governments," Fishman said. The OECD Secretariat itself recently noted the "important economic interests involved in protecting the national industries" operating data networks.

Representatives to the OECD "really haven't focused on" the problem yet, Fishman said, but it is important for the U.S. to start planning for this second round of negotiations, expected to get under way soon.

Although there has not been any "serious discussion" yet, "the economic stakes are going to be enormous and people are starting to recognize this — more so in Europe than here," according to Fishman. As part of its educational campaign, the Administration will brief various congressional committees on the guidelines and disseminate them throughout the federal bureaucracy.

Canada has also moved to develop policies for data protection and to foster its native data processing and telecommunications industries.

Starting at Home

Addressing the topic of government action in privacy protection, Richard Neustadt, assistant director of the White House Domestic Policy Staff, said one reason for the Administration's "privacy initiative," which includes a number of legislative proposals and policies to ugrade personal privacy protection in the U.S., is the increasing international implications of domestic privacy activities.

"As a matter of U.S. foreign policy and economy," the Administration must foster good information practices at home, Neustadt said. "The U.S. now has a comprehensive framework for privacy policy" and the private sector must adopt a clear commitment to implement the policies, which are basically voluntary.

Referring to U.S. success in negotiating the voluntary OECD guidelines, Neustadt said "it was hard to persuade the Europeans to adopt a sensible approach [to privacy protection] until we had adopted one of our own."

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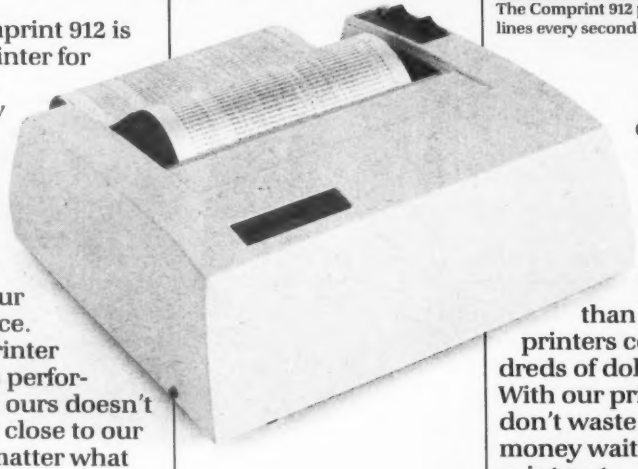

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Flourishes Again in California

Mini/Micro Conference Makes a Comeback

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — After a year's absence, the annual Mini/Micro Conference and Exhibition's recent return to its southern California homeland was without much of the sickly pallor it contacted last year during its two out-of-state ventures.

By week's end, the three-day show, had drawn more than 10,000 paid attendees. The relatively strong showing followed a disappointingly feeble turn-out last year, when Mini/Micro's organizers broke with tradition by scheduling two shows instead of one and holding both outside California.

The two previous shows — the first in Philadelphia and the second in Houston — together mustered only a slightly larger crowd than the 1979 version.

Several attendees attributed this year's apparent comeback to the show's return to Southern California, where its strong vendor emphasis has always enjoyed wide appeal among the area's large, indigenous OEM population.

Another possible reason for Mini/Micro's relatively high attendance this year was that interest in the show was heightened when several of its some 250 exhibitors introduced products.

In one of the show's most important announcements, 3M Co. introduced a data cartridge system that reportedly costs 40 cents per 1M byte compared with $8.50 per 1M byte for its nearest 3M equivalent and $8 for 1M byte on an 8-in. double-sided, double-density floppy disk unit.

Intended as a backup for 8- and 14-in. Winchester-type disk systems, the HCD-75 provides 75M bytes of formatted storage and bytes of unformatted storage. That capacity represents 48 times more data than on 3M's existing cartridge system and more than twice as much as on a reel of .5-in., 1,600 bit/in. tape, a 3M spokesman explained.

In burst mode, the system transfers up to 4M byte/sec; otherwise, it transfers an average 20K byte/sec, the source added.

Microprocessors control the 16-track unit's read/write head poisitioning, self-diagnostics and error detection. Moreover, a microprocessor-controlled transport is said to eliminate all manual adjustments.

Measuring 4.62- by 7- by 19-in. (including format controller), the HCD-75 uses 3M's DC600HC cartrdige, a redesigned version of the firm;s original DC300A cartridge. The DC600HC contains 600 ft of .25-in. tape in a 4- by 6-in. package.

Capable of accommodating one to four transports, the system and its cartridge cost $2,150 and $30 each, respectively, and will become available during the second quarter next year.

Printers' Speed Doubled

In other Mini/Micro developments, Centronics Data Computer Corp. announced it has doubled the speed of its 730 series "miniprinters" without increasing their price.

With the enhancement, the seven members of the 730 line now output 100 char./sec, a Centronics spokesman said.

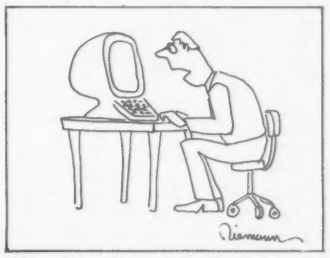
Despite the improved performance, the miniprinter line continues to cost $995 to $1,045, depending on configuration, he added.

Mitsubishi Distributor

Mitsubishi Electric Corp., meanwhile, used the show as an opportunity to announce the appointment of NCL Data, Inc. as distributor of the Japanese firm's M-series disk units.

NCL's selection will make Mitsubishi's disk systems available for the first time to the U.S. OEM market, a company spokesman said.

The M-series consists of five-high disk pack systems as well as floppy, fixed and cartridge disk units. NCL, a Santa Clara, Calif.-based distributor, will reportedly stress the five-high disk pack and the floppy disk units in its first marketing efforts.



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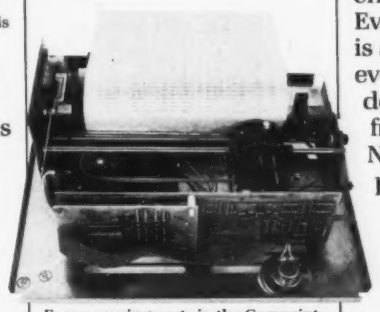

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Calendar

Oct. 30-Nov. 2, Ft. Lauderdale, Fla. — **E-18 on Sensory Evaluation of Materials and Products Meeting.** Contact: R.M. Sherwood, American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.

Nov. 12-14, New York — **Data Base Management Systems for Minis: A Comparative Analysis.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Chicago — **DP Operations Today: Effective Scheduling and Console Operations.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, New York — **Computer Performance Measurement: Tools and Techniques for Increased System Productivity.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, San Francisco — **Word Processing: An Overview of Concepts, Systems and Applications.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Chicago — **Automating Your Office Today: Planning and Implementation Methods.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 28-30 in San Francisco.

Nov. 12-14, Chicago — **DP Project Management: A Practical Approach.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 13-14, Chicago — **Computer Management in the '80s: Management Seminar.** Contact: Computer Power Management Corp., P.O. Box 1403, Rockville, Md. 20850.

Nov. 13-15, Washington, D.C. — **National Symposium on Computer Systems Enhancement.** Contact: Data Processing Management Association Educational Foundation, 1261 Davan Drive, Silver Spring, Md. 20904.

Nov. 13-15, New York — **Integrated Data/Voice/Facsimile Communications Conference.** Contact: McGraw-Hill Conference Center, Room 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

Nov. 13-16, Los Angeles — **Software Acquisition/Development Management,** sponsored by Software Enterprises Corp. Contact: Software Management Training Institute, 2239 Townsgate Road, Westlake Village, Calif. 91361.

Nov. 13-16, Toronto — **Canadian Computer Conference,** sponsored by the Canadian Information Processing Society and Canadian Datasystems. Contact: Industrial Trade Shows of Canada, 36 Butterick Road, Toronto, Ont. M8W 3Z8, Canada.

Nov. 14, St. Louis — **DP Performance Management.** Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

Nov. 14-16, San Francisco — **Structured Analysis and Design Seminar.** Contact: Institute for Advanced Technology, 6003 Executive Blvd., Rockville, Md. 20852.

Nov. 14-16, Houston — **Fall Industrial Engineering Conference.** Contact: American Institute of Industrial Engineers, 35 Technology Park, Atlanta, Ga. 30092.

Nov. 14-16, Washington, D.C. — **Federal Telecommunications Policy.** Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Nov. 14-15, Tulsa, Okla. — **Southwest Software Conference,** sponsored by the University of Tulsa. Contact: Milt Jarrett, Dean of Continuing Education, University of Tulsa, 600 S. College, Tulsa, Okla. 74104.

Nov. 14-16, London — **65th State-of-the-Art Conference: Computer Auditing and Control.** Contact: Infotech International Ltd., Nicholson House, Maidenhead, Berkshire S16 1LD, England.

Nov. 15, Southfield, Mich. — **Invitational Computer Conference.** Contact: B.J. Johnson & Associates, Suite 203, 2503 Eastbluff Drive, Newport Beach, Calif. 92660.

Nov. 15-16, Burlington, Vt. — **Cobol Programming Workshop.** Contact: Foundation for Continuing Education, 15 School St., Boston, Mass. 02108.

Nov. 15-16, New York — **DP Productivity Improvement Seminar.** Contact: Johnson Systems, Inc., 7923 Jones Branch Drive, McLean, Va. 22102.

Nov. 15-16, New York — **Minicomputers and Small Business Computers: Selection and Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 15-16, Washington, D.C. — **Data Communications: Advanced Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 16, Dallas — **DP Performance Management.** Contact: Applied Computer Research, P.O. Box 9280, Phoenix, Ariz. 85068.

Nov. 19-20, Orlando, Fla. — **Computer Negotiations Workshop.** Contact: International Computer Negotiations, Inc., 1331 Palmetto Ave., Winter Park, Fla. 32789.

Nov. 19-20, Boston — **DP Management.** Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

Nov. 19-20, San Francisco — **Data Communications Standards Conference.** Contact: McGraw-Hill Conference Center, 1221 Ave. of the Americas, New York, N.Y. 10020.

Nov. 26-28, San Francisco — **Automating and Integrating Office Systems: Tools and Implementation Strategies.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 26-30, Washington, D.C. — **National Institute of Electrical and Electronics Engineers Telecommunications Conference and Exposition.** Contact: Trade Associates, Inc., Suite 1025, 5454 Wisconsin Ave., Washington, D.C. 20015.

Nov. 26-29, Washington, D.C. — **Forms Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 26-30, Washington, D.C. — **Data Base Concepts and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 27-29, Washington, D.C. — **Communications Procurement Conference.** Contact: McGraw-Hill Conference Center, Room 3677, 1221 Ave. of the Americas, New York, N.Y. 10020.

Correction

The "Women in Data Processing Conference" will be held in New York Nov. 7, not Oct. 10 as announced in the Sept. 3 *Computerworld*. More information is available from Women in Data Processing, Suite 1511, Madison Ave., New York, N.Y. 10016.

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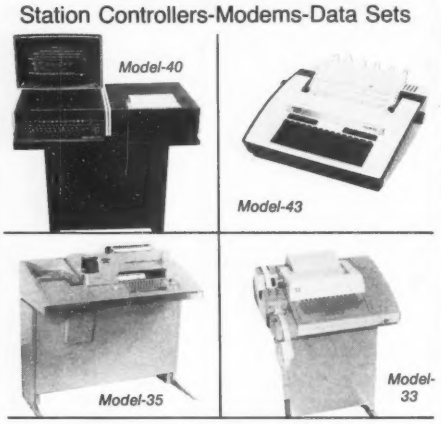

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U.S. vs. IBM Resumes; Vice-President Testifies About 360 Announcement

By Connie Winkler
CW Staff

NEW YORK — After a five-month hiatus, the U.S. vs. IBM antitrust trial is back where it left off in April — in the 1960s, reliving the announcement and development of the 360 mainframe line.

IBM's 20th witness, only the fourth in 1979, defended the timing and pricing of the 360 and subsequent, related products including the 2319 disk drive, the time-sharing 360/67 and the large 360/92.

Since 1971, Paul W. Knaplund has been an IBM vice-president in the corporate legal department; he was IBM's representative to settlement talks in the private lawsuits brought against IBM by Control Data Corp. and Telex. To show his bias as a witness, the Justice Department questioned him extensively on his involvement with IBM legal matters.

Most of Knaplund's four days on the stand were spent reviewing IBM internal letters, many of which had been previously introduced in the case. Knaplund said he had not seen or did not recall many of those letters.

'Gimmicky Tactics'

In 1971, Knaplund wrote in longhand to then-vice-president T. Vincent Learson that "pricing and packaging gimmicks may buy us some time, but so far we haven't used that time effectively." The government tried to relate that letter to similar handwritten (but undated and not specifically identified) notes on what Knaplund also called the "gimmicky tactics" of "repackaging and repricing [equipment] such as 2319."

The 2319 disk drive, announced in 1971, consisted of three disk spindles in one box priced considerably lower than a single 2314 spindle. The Justice Department contends IBM repackaged the 2314 and juggled channel interfaces to undercut independent peripheral manufacturers.

"It was my view that it was a gimmick tactic. I don't consider reducing prices a gimmicky tactic. That's a common business move usually well-received by the customer," Knaplund said about the 2319 on cross-examination by Justice lawyer Mark W. Gaffney.

On redirect examination by IBM counsel Robert Mullen, Knaplund said that between 1971 and 1973, while studying IBM's position on communications products, he learned that packaging "device-dependent electronics" outside the 2319 allowed for attachment of other devices. When he wrote the "gimmicky" letter, Knaplund said, he was concerned about delays in IBM's Winchester disk technology development program, which eventually resulted in the 3340 disk drive.

The IBM vice-president later learned the delays resulted from IBM employees being hired away from the San Jose laboratory and misappropriated designs, he testified.

At the announcement of the 360 series in April 1964, Knaplund — as assistant group executive for the Data Processing Product Group — was in charge of 360 pricing. A key government charge is that IBM announced the 360 line prematurely to counter competitors' offerings, especially those of CDC, and that prices were based on competitors' charges.

"It was my best business judgment that only by fully informing customers and prospects of the full System/360 compatibility range, including prices and functional specifications, could those customers and prospects evaluate IBM offerings," Knaplund said in his 92-page written direct testimony.

Although in late 1965 and 1966 IBM had to slip customer delivery dates, Knaplund argued that the company still increased its manufacturing capability 74% to bring out the machines.

He also presented a new defense of why not all customers got 360 deliveries on time: in 1966, about 15% of the computer orders had defense priority because of the war in Vietnam and were given preferential delivery.

Although the 360/90 (later 92) supercomputer was referenced in the 360 announcement, it was the least developed. The 92 overran costs, and IBM projected the CPU would lose $20 million to $30 million. Knaplund testified he decided to go along with a cost allocation method proposed by Controller Hilary A. Faw.

Using this "investment analysis" or "incremental cost" approach, development costs were apportioned over development and research projects beyond the Model 92.

Fighting Machine?

The government contends that the time-sharing Model 67 was also known about in the industry long before its announcement — thus scaring users from competitors' machines — and that IBM did not have the machine far enough along in development when it was announced. This meant IBM had to spend extra money to get the machine out on time.

Knaplund agreed that only 40% of the 360/67 programming costs were allocated to the Model 67, but the remainder was written off to the Models 57 and 87, which IBM intended to introduce. The 57 and 87 were never announced.

Not allocating these programming costs to other machines would have meant the 360/67 lost millions of dollars. This tends to support the government's contention that the 67 was a fighting machine, aimed at weakening competition and not at profitability.

"The proposal to allocate TSS programming expenses to future time-sharing CPUs came to me from the Group Controller's office," Knaplund testified. "I agreed with it because, given the consideration of development funding for other time-sharing CPUs it was my judgment that the Model 67 program should not bear a disproportionate share of the estimated programming development expenditure."

Unanticipated problems in time-sharing programming scuttled other time-sharing systems, but dynamic relocation was introduced in the 370 line of mainframes, Knaplund said.

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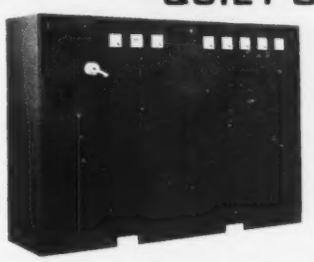

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Hunt Pleads Guilty to Charges of Mail Fraud

TUCSON, Ariz. — Norman Henry Hunt, the California prison escapee charged with forming a bogus microcomputer firm called World Power Systems, Inc. to swindle hobbyists and suppliers, recently pleaded guilty to two counts of mail fraud in U.S. district court here.

Hunt, who faced an 11-count indictment for the crime, made the guilty plea Sept. 17 and several days later pleaded guilty in a California federal district court to one count of fraud for a similar scheme which he allegedly set-up before World Power.

Hunt faces up to 10 years in prison and a fine of $2,000 on the two World Power counts. He will be sentenced by U.S. District Court Judge James A. Walsh on Oct. 22 and again Oct. 29 in Los Angeles federal district court.

The California sentence will run concurrently with the one in Arizona, but it is unclear at this point whether Hunt will first return to Chino State Prison in California to complete his prison term there before serving tiem for the federal court.

Dinah Lee Hunt, Hunt's wife, also entered a guilty plea on one count and admitted to concealing World Power's illegal activities. She stated, however, that she was initially unaware of the company's fraudulent operations. She will be sentenced here Oct. 29.

Hunt implemented his ripoff scheme by advertising nonexistent computer equipment in most of the major hobby magazines, collecting money from customers and accepting equipment parts from suppliers on credit, all with the intention of leaving with the money and reselling the equipment elsewhere [CW, May 14].

Hunt's scheme began to fall apart early, however, and he had to leave the Tucson area abruptly, leaving behind portions of the equipment obtained on credit. He and his wife were captured in Honolulu on May 30 by federal agents [CW, June 11].

Investigators have determined that at least 100 customers and more than 50 suppliers who sold equipment to Hunt on credit were victimized. The total dollar amount involved has not been determined because the value of the equipment cannot be accurately assessed. Only $11,000 was found on the Hunts when they were apprehended.

Mirabito to Keynote ACM Meet

DETROIT — Paul S. Mirabito, chairman of Burroughs Corp., will deliver the keynote address at this year's Association for Computing Machinery (ACM) annual conference and exhibition.

Slated for Oct. 29-31, the conference will also feature fifty-five displays of computer hardware and software that illustrate the use of computers in business applications, office automation, personal computing and computer-based education. In addition, 15 publishers will exhibit their publications on computer science.

Twenty-six panels and paper sessions are scheduled, including one on the Pascal Users Forum, providing a current review of experience with the language.

Other speakers will include the Hon. Jordan J. Baruch, assistant secretary of commerce for science and technology; Edward Yourdon, president of Yourdon, Inc., who will speak on " Software Development and Management"; and Thomas DeFanti of the University of Illinois-Chicago Circle, who will discuss "Graphics With Personal Computing Systems."

Cost of the conference is $65 for ACM members, $90 for nonmembers and $15 for students. The public is invited to view the exhibits using $3 "walk-in" tickets.

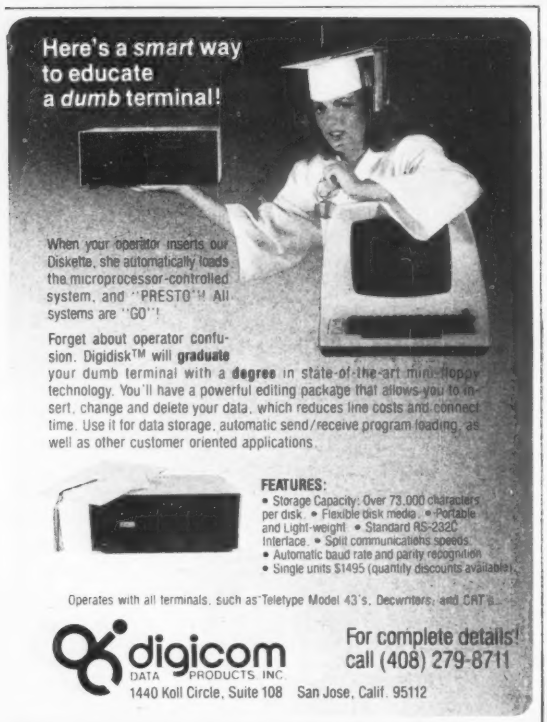
Conference registration may be made through ACM '79, P.O. Box 411, Troy, Mich. 48099.

Real Decisions To Hold Seminar Oct. 29-31

STAMFORD, Conn. — End-user requirements, alternatives and applications will be the focus of a three-day seminar sponsored by Real Decisions Corp. Oct. 29-31 in Tampa, Fla.

Keynoted by Charles Lecht, president of Advanced Computer Techniques Corp., "Decision 1980: Meeting the End-User Challenge "will concentrate on surveying and identifying user needs and will explore the various hardware/-software packages available to fit those needs, a spokesman stated. The seminar will also zero in on the proper role for time-sharing services and detail the criteria needed to service the end-user.

Cost of the seminar, including workbooks and other materials, is $595 per person. Registration covers all conference sessions, the spokesman said from 111 High Ridge Road, Stamford, Conn. 06905.



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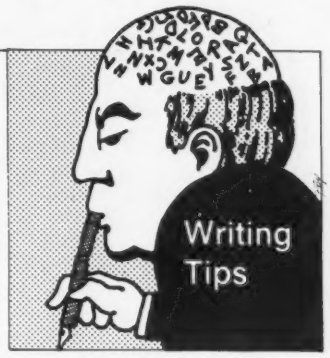
Can Your Sentences Pass the 'Yes-No Test'?

Ruth Schiff Winett



This is the second in a series of 12 articles on better writing.

What if a derivative is a "differential coefficient"?

Sometimes it is easy to define a concept. And still not understand the significance of the concept. There is a vast difference between being able to define a "derivative" as a "differential coefficient," as *Webster's New World Dictionary of the American Language* does, and being able to use differential equations to solve engineering problems. Similarly, people can state that a "sentence is a complete thought." And still not be able to correct the errors in this paragraph. Even sophisticated writers. Inadvertently make errors in sentence construction the two major categories of sentence errors are. Sentence fragments (cliff-hangers) and run-together sentences (run-ons).

How do writers edit sentences such as those in the previous paragraph? There are several fairly reliable indicators of sentence integrity. Besides asking themselves if the group of words expresses a complete thought, writers should note if their voices would naturally fall if they were to read the sentence aloud.

A little known but perhaps more clear-cut test is the "yes-no test." According to Ann Raimes in *Focus on Composition*, a "base" sentence can be transformed into a question which can be answered with a yes or a no. The following example illustrates how the yes-no test works:

Example 1: Readers of *Computerworld* want to know about the latest developments in data processing.

Yes-No Test: Do readers of *Computerworld* want to know about the latest developments in data processing? (Example 1 is a complete sentence.)

Example 2: Third-generation computers are faster and more compact than first- and second-generation computers.

Yes-No Test: Are third-generation computers faster and more compact than first- or second-generation computers? (Example 2 is a complete sentence.)

Cliff-Hanging Sentences

Some sentences, however, are cliff-hangers that leave the reader suspended in anticipation, like a television viewer who has just watched an episode which ends with the hero hanging from a cliff by fingernails. Verbal cliff-hangers lack either a subject or a verb or both:

Example 3: Not receiving security clearance.

Since there is no subject and no verb, the yes-no test cannot be used.

Remedy A: The candidate for the job did not receive security clearance (subject added participle [*-ing* word] changed to a verb.)

Remedy B: The candidate who could not get security clearance lost the job. (A subject and a dependent clause are added; the participle is changed to a verb; a dependent clause is also added.)

Remedy C. He lost the job because he could not get security clearance. (A subject, verb and dependent clause have been added.)

The yes-no test can be successfully applied to all three remedied revisions revisions.

Example 4: Having already ordered a minicomputer.

Since there is no subject and no verb, Example 4 cannot be stated as a yes-no question.)

Remedy A: The finance company, which had not already ordered a minicomputer, was interested in leasing another large computer. (A subject, verb and "which" clause have been added.)

Again, once the original sentence has been revised, yes-no questions may be formulated.

Ways to Halt Run-On

Even more troublesome than the sentence fragment is the run-on sentence. In a run-on sentence, two or more clauses are strung together without being properly punctuated. Often these clauses have conjunctions, but lack commas or semicolons:

Example 5: The order for an additional supply of magnetic tapes was lost we were short of tapes the following month.

Yes-No Test: Was an order for an additional supply of magnetic tapes lost? Were we short of tapes the following month? Since two yes-no questions can be formed from Example 5, it is evident that it is a run-on sentence.

Writers may revise such run-on sentences as Example 5 in one of three ways. The easiest method is simply to divide the run-on sentence into two or more sentences:

Remedy A: The order for an additional supply of magnetic tapes was lost. We were short of tapes the following month.

The second method is to use a semicolon to separate the different clauses of the sentence:

Remedy B: The order for an additional supply of magnetic tapes was lost; we were short of tapes the following month.

Alternatively, writers may use a conjunctive adverb (e.g., "besides," "consequently," "moreover," "nevertheless," "however," and "thus") or a transitional phrase ("on the other hand," "in the meantime," "for example" or "in fact") along with a semicolon. Since these words and expressions are set off by commas wherever they appear in a sentence, when they are used between two clauses they are followed by a comma. (For example: the order for an additional supply of magnetic tape was lost; *as a result*, we were short of tapes the following month.)

The third method of separating run-together sentences is to use a comma and coordinating conjunction such as "and," "but," "or," "nor" and "for."

Example 6: The order for an additional supply of magnetic tape was lost, and we were short of tapes the following month.

Thus, the period separates the two clauses; the semicolon links the clauses; and the coordinating conjunction actually relates the two to each other. Writers should select whichever conjunction most accurately conveys the relationship between the two clauses.

In order to avoid confusing their readers, writers should carefully avoid fragments and run-ons. If the yes-no test indicates a group of words is fragment, a subject or verb or both should be added.

If, on the other hand, the test indicates that the sentence is a run-on, a period, semicolon or a comma and coordinating conjunction should be used.

Now attempt to revise the first paragraph of this article. The corrections for the first paragraph follow:

Sometimes it is easy to define a concept and still not understand the significance of the concept. There is a vast difference between being able to define a "derivative" as a "differential coefficient," as *Webster's New World Dictionary of the American Language* does, and being able to use differential equations to solve engineering problems. Similarly, people can state that a "sentence is a complete thought," and still not be able to correct the errors in this paragraph. Even sophisticated writers may inadvertently make errors in sentence construction. The two major categories of sentence errors are sentence fragments (cliff-hangers) and run-together sentences (run-ons).

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EDITORIAL

The Latest Victim

Itel Corp. has joined the list of mainframe computer suppliers forced out of the business by IBM's entrenched position in the marketplace.

In the last 10 years, four other firms — RCA Corp., General Electric Co., Memorex Corp. and Xerox Corp. — have also left the mainframe marketplace, and all have left primarily because of IBM's dominance in that market.

RCA, GE and Xerox were casualties, dropping out of the mainframe race because each felt that the investment needed in order to compete with IBM would be too great. Memorex, which was really the first firm to make computers that were compatible with IBM software, suffered as a result of both IBM's position and its own internal mismanagement. All four have proved successful in other areas of the computer business where they did not have to compete head to head, across the board, with IBM.

Itel, while always highly leveraged financially, seemed in good shape with increasing revenues and earnings and a management team that was considered among the best in the business.

But that was before IBM started floating rumors about the 4300 and the H series and before the industry giant actually announced the 4300 with its dramatic price/performance improvements. Suddenly Itel, which had expected to sell 400 of its AS machines this year, saw its order rates slow to a trickle and then almost stop.

The original management team was forced out and earnings turned into losses; finally, it sold out to National Semiconductor Corp., which earlier had refused to renegotiate its contract to supply Itel with computers and therefore also had much to do with Itel's demise.

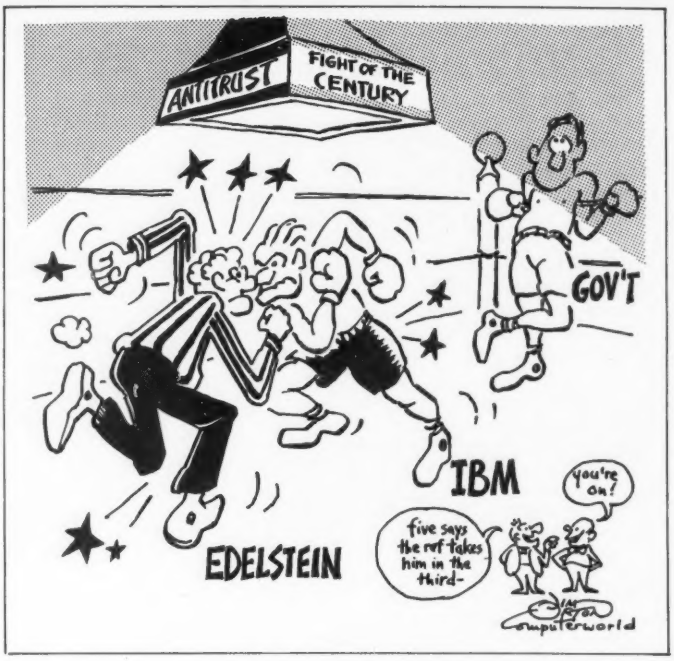
But while National Semi's intransigence may have been the straw that broke the camel's back in the Itel case, clearly the IBM 4300 announcement was the major cause of Itel's failure.

The whole process is a vicious circle: Competitors enter the market, forcing IBM to become more competitive. When the competitors get a large enough market share, IBM reacts and by its reaction forces others out of the market. Then there is a hiatus while IBM faces diminished competition; it does not show its innovative skills and the industry seems to stagnate.

The user, of course, is caught in the middle of all this. By supporting competitive products, users force IBM to become more competitive. But when that happens, some users can be left holding the bag.

The only way this cycle might be broken could be through antitrust action, but there is little hope that anything will ever happen in that arena. The U.S. government's major action against IBM has been so mismanaged — legally and judicially — that it has become a standing joke in the industry.

Unfortunately, it seems users will have to face the same cycle again and again until there is full and, more important, fair competition in the computer industry.



DATA PAST

Five Years Ago
Oct. 9, 1974

WASHINGTON, D.C. — In its first software case since the 1972 decision in Benson-Tabbott, the U.S. Court of Customs and Patent Appeals (CCPA) held that a software system is patentable subject matter when claimed as apparatus or as part of an overall computer system. By a three-to-two decision, CCPA reversed the finding of the Patent Office Board of Appeals, which held that an automatic financial recordingkeeping system that employs a digital computer could not be patented.

Eight Years Ago
Oct. 6, 1971

WASHINGTON, D.C. — Software and technological supporting systems are the Achilles heel of the computer industry, according to Dr. Ruth M. Davis, director of the National Bureau of Standards' Center for Computer Sciences and Technology.

The statement was made before the House Subcommittee on Science, Research and Development, which was conducting hearings to get an overview of that agency's activities.

LETTERS

AT&T Plans for EIS

In "AT&T Testing Viewdata-Type Service" [CW, Sept. 3], several erroneous points were made regarding AT&T's Electronic Information Service (EIS) concept trial.

The article stated, "According to Bell officials here managing EIS, future enhancements could include a wide variety of other services . . . remote computing, electronic mail . . . library-type data base retrieval . . . were specifically mentioned."

None of these services were cited during the interview by AT&T personnel. The reporter raised these and other examples of what *he* considered to be *possible* future EIS enhancements. And, when he did this, we cautioned him that he was speculating, without any factual, supporting data.

Now that these speculations have appeared in print, we are concerned about their potential ramifications. In fact, we have already been questioned by outside organizations about AT&T's plans for electronic mail and library-data retrieval systems.

AT&T has no such plans.

E. Hancharik
Director, Directory Services
AT&T
Parsippany, N.J.

On 'Girl Friday'

As a professional in the computer software world, I am always alert to the attitude of male dominance which pervades our industry.

I noted with particular irony the Sept. 24 editorial on the subject of Pan-Energy Corp.'s "Girl Friday" system. Etymological research on jargon is chancy at best, but the only logical root for "girl friday" is the story of Robinson Crusoe and his "Man Friday," who could do everything.

Have we now come full circle? The original Friday was certainly a male, and putting the word "girl" in place of "man" must have been an attempt to indicate that a female assistant could function as efficiently as that legendary male assistant. This term is a recent addition to business jargon and probably most prevalent in this country. I suspect that its origin was not intended to depreciate women, but instead to enhance their desirability as capable helpers by comparing them to a documented case of male indispensability.

We mustn't let our genuine concern for fair semantic treatment of women get diluted by paper windmills; it focuses attention on the symptom instead of the disease!

Marjorie L. Reinke
Melbourne, Fla.

Managers, Not Politicians

I read with anticipation "DP Managers Required to Be Politicians, Too" [CW, Sept. 17]. However, the further I proceeded through the article, the more disappointed and/or disgusted I became.

The successful DP manager must be a good business manager and, therefore, must be able to get things done on time and within a projected budget. It is a ridiculous classification to say that a DP manager who lives within a budget and resolves user problems is a politician. I would prefer to state that he is an astute business manager using all of the management techniques at his disposal.

It is unfortunate that Jack Stone's article came across as a sour grapes expose of one situation.

Another unfortunate point the article made was that an ex-DP manager no longer held his position because he wasn't a politician. A better perspective from the content of the article indicates that the person was most likely too much of a technician and not a "politician." The truly successful DP managers, again, are business managers and quite frequently do not require a technical expertise in order to be able to fulfill the needs of their company.

Dennis J. Shonebarger
Columbus, Ohio

READER COMMENTARY/ Joe Rigo

NCC: Our Annual March to the Ocean?

About 4,000 people attended the recent Share Conference in New York. I was number 4,001 — unregistered, but hanging around.

I was hoping to see some of my old IBM cronies. But it was not to be. The people I used to work with at IBM are in the wheelchair crowd by now. The youngest of them is pushing 40. The average age at a Share conference must be 24, and dropping yearly.

Attendance is slightly higher (and quite a bit older) at a Guide meeting. But the difference is not important. Both groups are tiny in comparison with the 80,000 who attended the last National Computer Conference.

The important point is that, after all these years, Guide and Share are still the best shows in the business. Both are IBM user groups, and they exist solely because they help IBM sell its products. But they are so good — so awfully good.

The difference between the two groups is fuzzy. It could be said that Share is for people who crunch numbers or design marketing systems. Guide is for the accounting department and for people who update files.

It really doesn't matter. Both groups meet two to four times a year, and their main topic is system software. Mainly, it is IBM systems software, but other products are well represented.

Typical Meetings

There are three types of sessions.

First, IBM technical staff members and salespeople talk about their latest goodies. The conversation centers on bits and bytes — not color schemes.

Second, users talk about their own experiences with IBM software. They delight in boasting about their ingenious ways of getting around the worst outrages in the current release, and they draw up wish lists for future versions.

Finally, there are dozens of highly specialized off-the-wall sessions for small groups. For example, 10 or 12 programmers from college computer centers get together to talk about their local modifications to the Wylbur text editor.

Share and Guide conferences work very well. There are several reasons, but mainly it is because they are well planned and well financed. People are paid to make sure the meetings are productive.

NCC: Another Story

In contrast, meetings at the National Computer Conference are planned entirely by volunteers working in their spare time. A professional staff takes care of the exhibits, but the technical program starts from scratch every year.

The result is a highly uneven conference. Some sessions are excellent by every standard, but the overall atmosphere is more carnival than business. The circus is in town, and the NCC's volunteers cannot compete with IBM's professionals.

Still, the conference makes a mint. The exhibits draw larger crowds every year and the technical program does well, if only because, whatever its faults, it's still the best show available for most of us.

The conference makes so much money that it causes a problem for its sponsor, the American Federation of Information Processing Societies (Afips). The volunteer elder statesmen who run Afips don't know what to do with their huge annual surplus.

Only a cynic would suggest that the entire NCC structure exists just so this year's Afips president can warm a chair at the White House for a few hours next spring. But if that is not the objective, what is?

The Afips elders feel they have a mission to use conference profits to improve the overall state of mankind. They do not believe that plowing the money back into the conference would accomplish this objecitve. So they spend a great deal of time discussing other approaches.

Afips 'Charities'

Right now, Afips has two favorite charities. It buys drinks for politicians, and it gives honors to college professors.

There is a great deal to be said for keeping politicians in a permanent drunken stupor, and the professors are okay as long as they don't feel required to make acceptance speeches. Still, none of this does much for the DP analysts and managers who register for the NCC technical sessions and make the whole conference respectable.

It is also sort of silly. For example, there is no legitimate reason for Afips to even have a Washington staff. Its membership is much too diverse to ever agree on a political position, and the organization has not developed any area of expertise that would be useful for the legislative process.

Still, the Washington operation gets bigger all the time. Its agents have become skilled at picking up bar tabs, and they are beginning to show results.

Their supreme accomplishment to date has been to arrange an annual White House briefing for senior Afips volunteers and their guests. At these sessions, spokesmen for various agencies talk about computers in government. Nothing much of importance goes on, but, given the location, who cares?

Meanwhile, the NCC keeps on growing. Thousands of man-hours and millions of dollars go into each year's meeting.

Only a cynic would suggest that the entire NCC structure exists just so this year's Afips president can warm a chair at the White House for a few hours next spring. But if that is not the objective, what is? It certainly is not to provide the best possible computer conference.

Maybe we are all lemmings at heart. We are just following our instincts. Instead of marching to the ocean, we stage our annual show. The circus has been automated, and it's all tax deductible.

Rigo is president of Sysdoc, Inc. in New York.

HUMAN CONNECTION/Jack Stone

Tips on 'Making a Difference' Apply to DP

In a semiwhimsical article recently published in the *Washington Post* [Sept. 23], Mark Green, author of *Who Runs Congress*, proffered some sage advice to the four new Cabinet secretaries. The article was titled "Open Letter to the Cabinet Newcomers, or How to Make a Difference and Avoid Instant Obscurity."

Since most DP managers serve constituencies which are usually critical, sometimes fractious and occasionally browbeating, I figured that Green had some valuable lessons for us DPers to learn as well. So I rewrote certain relevant parts of his article in DP terms and present them here for the general edification of DP managers, old and new.

- "Get first-hand experience."

Practically all DP managers are committed to staying in their offices, where they can be ready to attack the next crisis of the day. But over a period of time, they become more and more removed from the reality of the user environment. Too often, they wind up having to make key decisions about major projects with which they really have too little personal experience.

It surely would be useful for the DPer to "experience the community he is affecting, rather than 'experience' it derivatively through [systems documentation]." He or she should take a little time off and operate the airlines terminal or exchange a little money at the teller's cage or play some groceries past the optical scanner. He should also talk to the employees and local managers about their system needs and complaints. It's amazing how much can be learned in just an hour or two.

- "Develop a theme."

At the next major milestone in the schedule (new fiscal year, big project ends), the DP manager should select a theme or slogan for the next period of time which relates to a major goal that can be accomplished *without fail*.

"People remember grand schemes, not 10-point programs." The DPer should tell people "what he is going to do, do it and then tell the people he did it. As a result, the [DPer] can refer to this higher value as justification for not doing inconsistent things of lesser value. Without a theme, the [DPer] will be seen either as a technician or as Churchill's description of pudding."

- "Reach into, and motivate, the [DP staff]."

It's easy to let the daily grind wear down managers, no matter what field they're in. But what happens is that they come to feel besieged and they tend to "draw in the wagons" of their personal staffs. Maybe it's efficient to have the staff intervene with those trying users on the DP manager's behalf, but what happens when members of the staff lose *their* ability to deal effectively?

One way to increase staff effectiveness is for the senior DPer to "acknowledge the value and mission of [DP professionals in public circumstances. In many cases, this is sufficient] to motivate them to produce rather than coast." Another way is for the DP manager to contact specific employees way down the line for answers to specific questions about their particular jobs and not try to wade through the DP bureaucracy to get them. Most employees want to be recognized by the big boss — they like to have their existence at least acknowleged.

- "Develop a [user] cosntituency.

"Ostensibly a [DP manager] has a constituency of one — [his immediate manager] . . . . But unless he cultivates a supportive [user] constituency, [the DPer] will not have the roots to survive the first gusts of criticism or controversy."

In other words, it would be nice if the DP manager made strong friendships with some of the influential user executives — through exemplary performance, of course — to help dampen potential criticisms from other quarters of the user population.

- "Talk to your critics . . . but have your [assistant for user relations] answer them."

"It serves no purpose to convert occasional opponents into implacable enemies." Too many times, DP managers get all bent out of shape when user barbs fly into the front office from irate users. They will launch counterattacks and set back decent relationships for the next hardware generation.

It's far better to keep a sharp ear to the complaints and assure your users that you're listening, but then respond through an intermediary with whom the users have no axe to grind. And a thoughtful response is necessary, because as Green aptly said, "Though Henry Ford says he lives by the credo, 'complain never explain,' an attack unrebutted is an attack repeated."

Stone is president of Computer Education International, Suite 222, 2233 Wisconsin Ave. N.W., Washington D.C. 20007

LETTERS

'Prenubile' Documentation

In "In Search of Disciplined Documentation" [CW, Sept. 10], Robert Perron stated: "While programming progresses toward a highly manageable discipline, software documentation, for the most part, remains in a prenubile state."

This is indeed a new use for the word "prenubile." Are we to infer that when software documentation becomes nubile (that is, ready for marriage) it will then, like programming, be "highly manageable"?

Think again, Mr. Perron!

Marjorie Collins
Chicago Heights, Ill.

DPMA's 'Man' of the Year

In a recent editorial [Sept. 24], Pan-Energy Corp. was castigated for its sexism in naming a new system "Girl Friday." However, on the front page of the same issue was an announcement that Dr. Ruth M. Davis had been named the Data Processing Management Association's Computer Sciences Man of the Year.

Isn't Ruth a funny name for a man??

David L. Ross
Springfield, Ill.

Can Anyone Help?

We are trying to locate the manufacturer of file protect rings that prevents the file protect/write ring from being inserted into a reel of magnetic tape. This device converts the reel of tape to read-only storage.

There was a company in Tequesta, Fla., called Filegard Systems that sold these devices, but the company is apparently out of business. Does any reader know where we might obtain a similar product?

I can be reached at University Systems, Ohio State University, 13th Floor, Lincoln Tower, 1800 Cannon Drive, Columbus, Ohio 43210.

W.D. Voigt
Business Manager
Ohio State University
Columbus, Ohio

Sex Discrimination

I have just read a letter from Florence F. Marks published last spring [April 9] and would like to comment.

I am a professional woman who strongly disagrees with the author's statement that "it takes many women longer to mature into people with leadership abilities and the confidence to be decision makers." Marks made the common mistake of lumping all women into a single category.

I believe that because of the lack of emphasis placed on the importance of leadership qualities in young girls, many women may now find themselves with less experience and therefore less confidence than their male counterparts. However, some women were given the leadership preparation and are good leaders and decision makers.

Marks assumed there is an inherent difference between men and women that results in slower development of women leaders. This is blatant sex discrimination.

I want to stress the evaluation of the individual on the basis of performance. Some men and some women will become our leaders of tomorrow. If excuses are going to be made for failure, they should apply to all that fail instead of a small group.

Cheryl Davis
Richmond, Va.

Congratulations to Brill

I would like to take this opportunity to congratulate *Computerworld* and Kenneth Brill for "Pulling the Plug on Dirty Power" — a fine piece of journalism.

It has been my experience to find that the area of computer power has been clouded by a great deal of misinformation. All too often, self-serving interests promulgate their ideas at the cost of many dollars to the DP community.

The ability of CW to be informative and present unbiased information has enabled it to achieve the respect of the entire DP community. It is for that reason we have been an advertiser and a reader of the paper for many years.

Once more, congratulations to CW and Brill for a fine article.

Murray Lazar
Director of Marketing
Control Systems, Inc.
Middletown, N.Y.

Potentially Damaging Article

"Pulling the Plug on Dirty Power" [CW, Aug. 20] appalled me, not with the inaccuracies therein, but with the fact that *Computerworld* would publish such an article without checking its veracity. Do you realize the power of the press and the damage such an article can do?

Certainly in the future it should behoove you to verify articles for engineering accuracy. Even a lay engineer knows better than some of the anomalous comments in that article.

I presume Kenneth Brill presented himself to you as a "power consultant" but surely you would be expected to check his credentials and his ulterior motives for writing such an article.

Clarence Deal
Richardson, Texas

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters should be addressed to Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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LETTERS

Several Inaccuracies

I am surprised that *Computerworld* would print such a biased advertisement as "Pulling the Plug on Dirty Power" [Aug. 20]. This is particularly true when the product being promoted could hardly be termed "state-of-the-art" or even "current."

The subject article contained a number of either inaccurate or misleading statements:

• Figure 1 and the text ("Motorgenerator vs. Transformer") stated that isolation transformers do "a poor job" (or no job at all) on "normal" mode transients. The study upon which Figure 1 was supposedly based used only conventional "stepdown" distribution transformers, not high isolation transformers (HITs), which are specifically designed to eliminate line noise. A HIT will reduce transverse (normal) mode noise by 40dB at 200KHz and, when properly configured for the application, can be as effective in noise elimination as a motorgenerator — at a fraction of the cost.

• In the discussion of "tape changers," the article implied that motorgenerators are faster than tap changers. Load variations are the worst case dynamic condition for any line regulating equipment and motorgenerators have the slowest response (or correction) of any of the products described.

• Figure 3 and the accompanying text on uninterruptible power systems (UPS) costs vs. motorgenerator costs are completely inaccurate as far as present-day equipment and power costs are concerned. First, it should be emphasized that the installation cost for a motorgenerator at any given power level is almost always more than a UPS, particularly if you included batteries with the UPS which were sized to support the system for only the length of time the best motorgenerators can provide, one-half second.

Next, the "inefficiency" costs are way off, even without considering the cost of removing or neutralizing the excess heat given off by a motorgenerator. For any projected electricity costs, at least 5 cents per kilowatt hour must be used today.

The maintenance figures are even more incredible. I'll support all the single-module UPS (applicable to both 100- and 300 KVA) I can get for $8,000 a year — and pocket more than half of it. And while $1,000 may apply for the first year's motorgenerator maintenance expense, the fact is that rotary equipment wears as it runs, requiring increasingly greater maintenance as it ages. A solid-state UPS, however, becomes more reliable the longer it operates — with lower maintenance costs.

A more correct Figure 3 on the same eight-year basis but comparing a solid-state frequency converter, as well as a UPS with battery, to the motorgenerator is shown in the box.

• The statement early in the article that motorgenerators are the "hands-down choice of major computer manufacturers" is extremely misleading. It's true there are lots of motorgenerators in use with computers, but the majority are installed with older CPUs no longer in production.

	100KVA			300KVA		
	MG	UPS	Frequency Converter	MG	UPS	Frequency Converter
Inefficiency	$10,900	$ 4,800	$4,800	$25,000	$11,400	$11,400
Maintenance	2,000	4,000	2,000	3,000	5,000	2,000
Depreciation	5,500	9,400	7,300	10,000	15,500	12,400
Base Annual Operating Costs	$18,400	$18,200	$14,100	$38,000	$31,900	$25,800
Added Cost for Heat Removal	10,900	4,800	4,800	25,000	11,400	11,400
Total Annual Operating Costs	$29,300	$23,000	$18,900	$63,000	$43,300	$37,200

Comparison of Motorgenerator, UPS and Frequency Converter

The trend with new computer modules is overwhelmingly solid state, with such manufacturers as Amdahl Corp., Hewlett-Packard Co. and NCR Corp. already having made the switch to more modern and efficient solid-state devices. Further, an increasing majority of IBM CPUs are presently being installed with solid-state devices rather than motorgenerators.

One could say that the article was isolated from current reality by a rotating shaft.

John J. Waterman Jr.
Vice-President, Marketing
Elgar Corp.
San Diego, Calif.

Point-by-point rebuttals were also received from the following designers and manufacturers of uninterruptible power systems (UPS): Teledyne Inet, Emerson Electric Co., Topaz Electronics and Randolph Engineering, Inc. Ed.

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THE TAYLOR REPORT/Alan Taylor

How Do You Write a Computer User's Resume?

How would you write Leonardo DaVinci's resume, assuming that you had to? Would you describe him as a painter? Military defense engineer? Attack strategist? Anatomical artist? Hydraulic designer? What would you choose to emphasize, and what would you ignore?

Leonardo is not the only person who presented this type of difficulty. There were many others — "Renaissance men" we call them, people who could put their hands to many different tasks that nowadays would call for full-time specialists.

Nor was this peculiar multifunctioning ability limited to the Renaissance. Well after that, in the 1700s and 1800s, we find Ben Franklin (diplomat, engineer, writer, inventor), Thomas Jefferson (house and furniture designer, farmer, politician) and, in the computer field, Charles Babbage (postal system designer, "hardware" designer, tidal system mapper and investigator).

Of course, these were all "great men." However, the concept of the Renaissance multifunctioners is now considered something of a more simple, bygone age. Twentieth century complexity has made it more difficult for people to keep up in many different fields.

One exception that comes to mind is the modern computer user. By using computers with many different specialized applications, the user is effectively a specialist in more than one area. How, then, do you write a resume for a computer user specialist?

Accounting Plus

Take an accountant who has been using computerized accounting packages for five or so years. In the precomputer 20th century, an accountant would have been kept in an office, away from customers and other parts of the firm.

In current practice, however, the computer offers the accuracy and single-mindedness that human accounting formerly needed, giving the accountant time for keeping up with the human race — for handling customers and taking on other, nonaccounting duties. Word processing is one area that springs immediately to mind.

The user in this example may be called an "accountant plus." But plus what? It would be altogether inadequate to call him a computer operator, even though he may know enough about hardware, software and maintenance to keep the accounting systems effective and productive.

How would you describe such an individual on a resume? Or, for that matter, if you were a personnel officer, how would you define the position that he held in an organization?

Flexible Position Description

The work that these "accountants plus" are already doing is unique to each individual. Some will be particularly adept at handling machinery matters. A computer system specialist still has to have a "feel" for the equipment, so machine matters are perhaps an important aspect of his position.

Others taking advantage of the additional productivity effected by computers will be able to relate better to management problems or to the handling of customers, suppliers and contractors as well as the corresponding paperwork. The knowledge of the computerized system makes them invaluable in these areas also.

What is now rare, and will be even more rare as systems advance in reliability, is the person who can handle only the computer. Freedom from having to specialize in any one field is already here, thanks to computers.

We should take advantage of this freedom. It is, after all, a renaissance of its own; the computer has created an information-handling revolution of the same magnitude as the one spawned by the printing press long ago.

Clearly, a computer user's resume has to show the strong points. The computer operator capability must be there. The repertoire of computer applications already experienced must be there. But so must the noncomputer abilities: the experience with people, the skills at "butchering" or report writing or both. All should be there, although in any one context many of them may be irrelevant or of no particular value.

This possible irrelevance gives us a key to the nature of the computer renaissance person, inside or outside the computer industry. He is someone who can be totally employed while using only a part of his skills — without the other skills atrophying.

The new generation of resumes will have to be broken down into two separate considerations: first, the flexibility and quality of the person shown by computer-aided work experience; and second, the ability to perform, with or without computers and without previous experience, the major tasks ahead.

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Software Managers, Unite!

By Don Leavitt
CW Staff

WASHINGTON, D.C. — Of all the roles in the world of DP, that of software manager is perhaps the least understood and is certainly the least organized. Those two characterizations may account for the sorry state of many software projects.

In essence, that is the reasoning behind a short meeting, now scheduled for early November after a year of planning and evaluation, at which the American Software Management League will formally come into being.

The meeting will be held at the Capitol Yacht Club here on Tuesday, Nov. 7 from 5:30 p.m. on. The time and date were chosen deliberately to coincide with both the Federal Computer Conference and the IEEE Engineering Management Conference, but organizer John Cooper, president of Anchor Software Management Ltd., stressed the meeting is open to anyone interested.

Guest speaker at the first meeting will be Barry DeRoze, now with TRW, Inc. and formerly with the Office of the Secretary of Defense.

The name of the proposed group may change, Cooper said — formal selection of the name is one of the goals of the organizational meeting — but the need for such a group is overwhelmingly obvious.

Managing software development is the key to controlling the cost of the projects and bringing them to completion on time and on budget. More than that, Cooper and his colleagues argue, good software management will mean the project results are both effective and efficient.

Almost every other facet of the DP operation, including management above the DP staff, has a professional organization to support its work.

Commenting on programmers, he noted that their work, at least conceptually, has gained the sense of order — the word "structured" sometimes seems all-pervasive — he hopes to provide for the people who maintain those functions.

Perhaps the key to that management, he said in another interview, is an understanding of the impact of changes — requested and required — that occur during the development process. With that understanding, the dynamic nature of the process and of the systems it is meant to produce can be controlled.

There will be a $10 registration fee for the meeting. More information is available from Cooper at Anchor, Tower 2000, 5800 Quantrell St., P.O. Box 11046, Alexandria, Va. 22312.

Accounting Package Readied for VSE

McLEAN, Va. — Scheduled for distribution before the end of the year, Release 4.0 of the Job Accounting Report System (Jars) from Johnson Systems, Inc. supports IBM's DOS/VSE and the 4300 processor.

There are several improvements to the basic Jars package in addition to VSE support. The most important is "substantial" runtime savings — "up to 50%," the spokesman claimed — when Release 4.0 is generating user-defined reports.

Other significant enhancements are said to include billing and utilization reporting for both special forms handling and remote job entry work. The package also allows an increased number of sort fields for reports and summary file creation and interchangeability of all Jars disk and tape files.

That interchangeability adds a flexibility that Jars simply did not have before. The change should make it easier for user sites to change to and use modern peripherals as they become available, Johnson said.

DOS Jars 4.0 costs $4,000; an optional Power/VS interface costs an additional $2,000, the vendor said from 7923 Jones Branch Drive, McLean, Va. 22102.

'IQ/3000' Boosts Access to DBMS

ARLINGTON, Va. — A query package that lets users of Hewlett-Packard Co. HP 3000 equipment find, format and report information stored under the Image/3000 data base management system (DBMS) is now available from Keydata Corp.

IQ/3000 is a command-driven package that lets users add, modify or delete data in an adhoc manner or create their own files of often-used command strings. It can be used in either on-line or batch mode for virtually any type of application, a vendor spokesman said.

Although it has features that go beyond HP's Query facility, IQ/3000 users command names and syntax similar to it so that retraining is minimized.

Keydata's package provides multidata set access for both retrieval and reporting, as long as the data sets are within the same data base. It also allows users to combine data items, substrings and constants by using four arithmetic operators, the spokesman noted.

IQ/3000 also allows flexibility in comparing arithmetic expressions of dissimilar type or length by using all seven relational operators provided by HP's Query. Six special text field relational operators and substring operators enable users to look at specific locations within items, Keydata said.

Distributed on magnetic tape, the IQ/3000 package includes object code, security and error-message systems and documentation. It costs $5,000 or $300/mo and is being marketed by Keydata's office at Suite 100, 1400 Wilson Road, Arlington, Va. 22209.

Data Entry Eased on Prime CPUs

PHOENIX — Software to help the less sophisticated user through data entry operations on Prime Computer, Inc. Prime 350 or larger processors has been introduced by Database Systems, Inc.

Entry I runs as a shared task under the Primos operating system and supports "block mode" terminal devices with features that include cursor addressing, protected fields, reverse video, blinking and page transmission, all under program control.

Entry I functions are selected through the use of a hierarchical menu system. All options for each function are displayed each time a selection is necessary. In addition, all aspects of the operation are simplified and the need to refer to manuals is reduced.

Operational features of the package include left or right justification with space or zero fill, modulo 10 or 11 check digit tests and batch accumulation, table lookup or extraction. Verification, form-linking, range-checking, constant insertion and automatic duplication of information are still other capabilities.

Entry II is an extension option that allows user application programs to invoke and interact with the data entry forms created under Entry I. This secondary package includes a library of subroutines accessible by any high-level language that supports the CALL statement.

Entry I and Entry II are available now in object form under licenses costing $5,000 and $2,000, respectively. The vendor is at Suite 710, 5251 N. 16th St., Phoenix, Ariz. 85016.

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Five-Year Job Cut to Two Months

Assessors Find Package Eases Implementation of Proposition 13

By Charles Holmberg IV
Special to CW

MODESTO, Calif. — The passage of Proposition 13 June 6, 1978 greatly affected local government in California.

Stanislaus County, whose seat of government is here, is a fast-growing county in the heart of the San Joaquin Valley. Its growth has placed a strain on the county government's DP center as demands rise in proportion to the population.

The Easytrieve package from Pansophic Systems, Inc. was installed in the fall of 1976 for use on our DOS-based IBM 360/40 to help meet these increased demands. The use of the package had increased steadily in the interim, but it was not until a crisis situation — the initial implementation of Proposition 13 — that we realized its true worth.

The initial and most dramatic impact was felt by the assessors' offices in the state's counties. Their mandated task is to produce an assessment roll each year by July 1.

All counties were busy pursuing this goal at the time of the election. Proposition 13 required that properties be rolled back or be brought up to a 1975 value and factored by 2% for each assessment year up to 1978.

This in itself is simple and to the point. However, the new law also stated that whenever property was transferred or improved, the property was to be reappraised as of the date of transfer or addition to value. To further complicate matters, certain types of transfer were exempt from reappraisal.

The major problem, then, was to produce an assessment roll reflecting these changes by Aug. 21 — a seven-week extension from the July 1 deadline. For Stanislaus County, medium-size in both population and assessable parcels, Proposition 13 meant doing in two months what normally is accomplished in a five-year appraisal cycle.

How was this done? Fortunately, we had two items: a neighborhood code and Easytrieve.

Review, Update Cycle

The neighborhood code aided considerably in allowing the Assessor's staff to divide the county geographically and apply value factors reflecting either an increase or decrease to a 1975 assessment.

Once the neighborhood codes and their corresponding factors were determined, their values were input to an Easytrieve table that was then passed against the entire master property record, producing values necessary to write the 1978 Proposition 13 roll.

After the factoring was complete, an Easytrieve program produced a report detailing parcel information, neighborhood codes, pre- and post-factored values as well as the factors used to arrive at the new values. This report was then reviewed by the appraisal staff and was used as an input document for changes necessary due to transfer of property, changes in improvement values and so on.

After changes to values, factors and neighborhood codes were entered, another Easytrieve program processed the changes — even refactored values when necessary — and produced an update to the original report, listing the parcels that had been changed.

This cycle of review and update continued for the two-month duration of the implementation of Proposition 13. Also during this time, legal interpretations of Proposition 13 changed the techniques of reappraisal a number of times. Reports detailing those parcels affected by these changes were made readily available by Easytrieve.

The results for Stanislaus County were the following:

- Forty-five percent of the assessable parcels required no change in factored values; the remainder needed changing due to transfer, addition to value and so on.
- Only 2.3% of the final assessment roll required correction.
- The county printed a Proposition 13 roll two weeks prior to the Aug. 21 deadline.

Holmberg is a systems analyst with Stanislaus County government in Modesto, Calif., where he is responsible for the Assessor's DP requirements.

Graphics Aid Pipe Planner

ST. LOUIS — Piping designers who use the piping stress analysis system Pipeline through the remote processing services of McDonnell Douglas Automation Co. (McAuto) can now view their input geometry on a graphics CRT terminal before Pipeline processing has begun.

This technique saves the piping analyst from conducting expensive computer analyses of piping systems that contain input data errors.

Fastdraw Link

The graphics capability in Pipeline is provided by a software link to Fastdraw, McAuto's interactive CRT graphics modeling and display system.

A user can view the piping model at any angle, "window in" for inspection of a detailed section of the model, label points and display data point coordinates.

Users are typically charged only for the system resources they used and for the time they were in use. More information is available from McAuto through P.O. Box 516, St. Louis, Mo. 63166.

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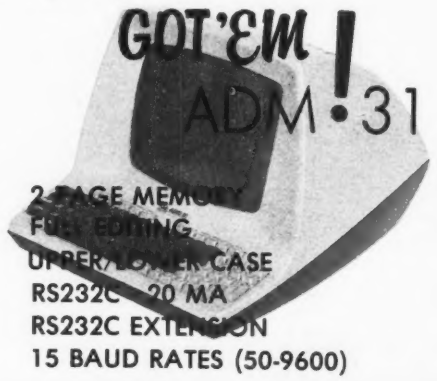

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'Status II' Retrieves Data From PDP-11s

CAMBERLEY, England — Status II from Systems Designers Ltd. is a software facility for information retrieval currently available for Digital Equipment Corp. PDP-11 users, but adaptable to other hardware, the vendor said.

Originated by the UK's Atomic Energy Research Establishment for bibliographic retrieval, the system has many potential applications, particularly when there are large volumes of textual information and modes of retrieval are not known at the time the data is entered, according to a spokesman.

Working with a CRT, the user can display such things as data items, titles, word frequencies or the count of items responding to his query. Alternatively, the user can route selected items to a printer or to a disk file for further processing or data base reorganization.

The user can produce output interactively and obtain an immediate CRT display or printed copy. This facility is best suited to small volumes of output, the company suggested.

The spokesman noted that the user may retrieve substantial amounts of information by setting up a file of questions which are then processed as a batch by Status II.

An authorized user can edit items prior to output. On the other hand, Status II offers protection at many levels, enabling the manager to control access and prevent unauthorized access and alterations to any part of the data base.

An exact fit between a query and available data is not always possible, so Status II supports user requests for a partial fit of, for example, seven out of 10 criteria to be satisfied.

Status II is available only from the vendor here, but the spokesman said he expects the company to release it in the U.S. within a year. It currently costs $40,000 and can be ordered from 1 Pembroke Broadway, Camberley, Surrey GUI5 3XH, England.

CDC Version of DBMS Updated

AUSTIN, Texas, — Enhancements and additional features have both been included in an updated version of the System 2000 data base management system (DBMS) from MRI Systems Corp. intended for users of Control Data Corp. equipment.

CDC Release 2.76 includes improvements to the report writer and new design aids for the data base administration (DBA) function, a spokeswoman said. The report writer, for example, now supports reporting from multiple logical files within one System 2000 data base.

Previous releases of the DBMS provided various DBA support functions. These included an EXAMINE INDEX command to verify index structure integrity and to display usage statistics and an EXAMINE TREE command to perform the same functions on the hierarchical table as EXAMINE INDEX did on the index.

Release 2.76 now provides an ANALYZE command to provide statistics on the "fit" of the data to the data base item description.

The updated CDC-oriented package has a base price of $70,000 and can be ordered from 12675 Research Blvd. (P.O. Box 9968), Austin, Texas 78766.

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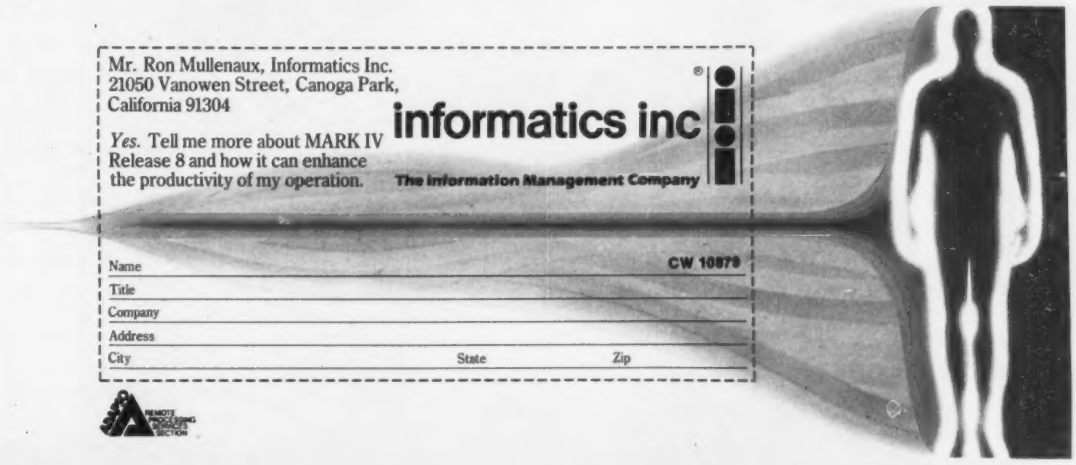

REMOTE PROCESSING SERVICES SECTION

Databus Macros Backed

KING OF PRUSSIA, Pa. — The Dmac-5 package just introduced by Trace Electronics, Inc. is a macroinstruction processor for Databus programmers working on Datapoint Corp. minicomputers. By supporting a macro capability, the package improves productivity and ensures programming consistency, a spokesman said.

The Trace software provides a method of both developing and storing macros consisting of Databus statements, symbolic parameters and special macro expansion commands. These macros can be inserted in a Databus program and expanded just as in an assembly language macro facility.

A key feature in Dmac-5 is a library which can hold macro definitions. As may as four macro libraries can be linked during a macro expansion run.

In addition to the library support, Dmac-5 includes a macro processor that expands macros and Databus source code into complete executable programs.

The potential power of the software is suggested by Trace's claim that in a typical case, 20 macro statements generated a 300-line Databus program.

The software runs on any Datapoint hardware system that supports Databus. It costs $2,500 and can be ordered from Trace at 570 W. DeKalb Pike, King of Prussia, Pa. 19406.

Series/1 Drives WP Work With EDX-Based Package

IRVINE, Calif. — A word processing (WP) system for the IBM Series/1 minicomputer is people-engineered to produce maximum performance with minimum human effort and training, according to the vendor, Gary Irwin and Associates.

Single-key entries perform most of the complex functions while other, built-in features eliminate, as much as possible, operator errors caused by the distractions of the office environment, a spokesman said.

The package runs under the Event-Driven Executive (EDX) and will support multiple terminals for WP work, even while other units can be used concurrently for DP operations. Central to the WP function is a document management system.

This management module creates a document library as a text description is entered. Text entered is later protected so it cannot be lost because of power failures or other abnormal terminations of the entry session, the spokesman explained.

Each document can have custom page formats, specified as the text is entered. In addition, an operator can insert characters or words in an existing line and the system will maintain the margins regardless of the length of the text inserted.

The search function, by itself, searches for a particular text and stops when it is located so it can be manually reviewed and edited. A search and replace function, on the other hand, substitutes a newly provided text for the target text, assuming it is present in the original document.

Scheduled to be released next month, the package costs $1,500 from Irwin's offices at 412 Williawaw Drive, Irvine Calif. 92714.

PDS Supported By 'UCC Six'

DALLAS — Release 2.3 of UCC Six, the IBM-oriented partitioned data set (PDS) management system from University Computing Co. (UCC), includes several enhancements for Time Sharing Option (TSO) operations as well as support for unlike devices for backup, a spokesman said.

TSO prompters for LINK and EDIT/SAVE functions under TSO have been made "transparent" so users need to learn only one set of commands to handle both PDS under UCC Six and those that are not.

Release 2.3 also simplifies the initialization of PDS under UCC Six and, at the other end of the control process, provides automatic recovery of the PDS directory space in the event it is otherwise lost.

The package costs $7,750 from the company at UCC Tower, Exchange Park, Dallas, Texas 75235.

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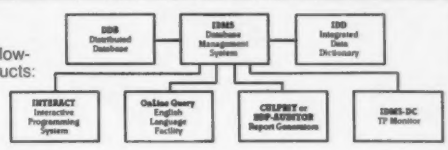

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C Compiler, Support Implemented on Micros

NEW YORK — A full C language compiler is now available from Whitesmiths, Ltd. for operation on 8080-, 8085- and Z80-based microcomputers running under the CP/M operating system. Included with the compiler are a library of portable functions, a loader, an 8080 runtime library, a narrative assembler for the language A-Natural and a librarian.

The CP/M-oriented package complements a Digital Equipment Corp. PDP-11-based C compiler and 8080 cross-compilers already released by Whitesmiths. All make available more than 75 functions for performing formatted or direct I/O, string manipulations and controlled storage allocation in a machine-independent fashion, a spokesman claimed.

Output from the loader is in either CP/M or Isis-II executable format. Separate read-only memory (ROM) and random access memory (RAM) load addresses may be specified and an Isis-II interface library is available, so C source code can be operated under CP/M or Isis-II or be burned into ROM for free-standing operation.

Library support exists for 16- and 32-bit integer arithmetic as well as 32- and 64-bit floating point; there are also reentrant routines for performing IN and OUT instructions from C, the spokesman said.

A-Natural, he added, is a narrative assembler for the 8080 and 8085 that eases the writing of the small amount of low-level support code needed by most C applications. The output of the C compiler is A-Natural, according to the spokesman.

The compiler itself consists of three sequential passes, each of which produces a file comparable in size to the original C source.

The 8080/Z80 compiler package costs $600 per CPU and is available in IBM 8-in. single-density disk form from Whitesmiths, Ltd., 127 E. 59 St., New York, N.Y. 10022 or in variety of diskette formats from Lifeboat Associates, 2248 Broadway, New York, N.Y. 10024.

LSI-11 Gets 'CIS Cobol'

LONDON — Micro Focus Ltd. has launched a full implementation of its Compact Interactive Standard (CIS) Cobol for Digital Equipment Corp.'s LSI-11 microprocessors running under DEC's RT-11 operating system.

The company has also opened an office in California to support U.S. and Canadian users, a spokesman noted.

The LSI-11 implementation can provide the user who is already DEC-oriented and has a means of off-loading Cobol development work to a far more cost-effective environment with the ability to move the completed programs to much larger equipment when appropriate.

Alternately, since the latest release is compatible with the existing CIS Cobol compiler for the Intel 8080 and Zilog Z80, it provides those users with a growth path they did not have previously.

The LSI-11 implementation is the first version of CIS Cobol to run on a 16-bit machine, the spokesman observed. Like the existing versions, it provides for compilation and execution of programs that conform to Level 1 ANS Cobol 74; it also offers several Level 2 features.

In a second mode of use, the compiler makes available the CIS Cobol extensions to the standard language.

The package costs $1,200 from Micro Focus Ltd., Suite 203, 1601 Civic Center Drive, Santa Clara, Calif. 95050 or the equivalent in British pounds from the company at 58 Acacia Road, St. Johns Wood, London NW8 6AG, England.

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As Rate War Escalates

IRCs Cut Telex Prices Up to 55 Cent/Min

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Reductions of up to 55 cent/min for international Telex users who pay domestic access line charges themselves have been offered by the four major U.S. international record carriers (IRC) in the latest round of an escalating rate war.

The battle began last July, when ITT offered to cut rates to 30 cent/min for such customers. Most of these customers now use tie lines or Western Union Telex/TWX circuits provided free or at reduced rates by ITT and the other IRCs.

TRT Telecommunications Corp. objected strenuously to ITT's proposal, arguing that smaller volume users would end up paying more than 30 cent/min if they had to acquire their own access facilities. The sole beneficiaries, TRT said, would be larger volume users of international Telex — they alone would be able to lease private lines and generate the traffic needed to bring the cost of operating such facilities below 30 cent/min.

TRT's big fear was that ITT's proposal would encourage large companies to give all their international Telex business to a single carrier. This would be an obvious way for a customer which leased its own private access line to reduce its cost.

TRT, because its service is less extensive than that of the other IRCs, "would be placed at an enormous competitive disadvantage" by such a development, a company spokesman pointed out.

TRT then made a counteroffer: It would match ITT's 30 cent/min rate cut for customers who agreed to pay domestic access charges and, in addition, would offer the same rate reduction to those customers serviced through TRT-provided tie lines.

"If the other IRCs choose to match this reduction, TRT's rate initiative will save U.S. international Telex users approximately $20 million annually," the company spokesman said, pointing out that ITT's proposal would cut rates only $6 million annually.

The Next Move

The next move came from RCA Global Communications, Inc. (Globcom). It offered a 55 cent/min reduction to international Telex users which agreed to pay their own access charges and which communicate with RCA Globcom's network at 300 bit/sec or less. For operations at a higher speed, RCA proposed a 30 cent/min reduction.

Earlier this month, ITT, TRT and Western Union International, Inc. (WUI) matched RCA Globcom's 55 cent/min offer, but applied it to those customers operating asynchronously at 1,200 bit/sec or less rather than 300 bit/sec. RCA Globcom then modified its tariff proposal to match the others.

All four carriers are now offering a 55 cent/min reduction to customers that pay their own access charges and transmit/receive at speeds of 1,200 bit/sec or less. In addition, they are proposing to cut rates 30 cent/min for such customers which operate at higher speeds. Some differences remain, however. TRT is the only one of the four IRCs offering the rate reduction to tie-line users.

ITT, meanwhile, contends that RCA Globcom's tariff is worded in a way that could restrict its 55 cent/min price cut to certain communications formats, creating "an opportunity, if not an incentive, for [RCA Globcom] to give favored treatment to preferred customers, thereby discriminating against other users, in an effort to capture a greater percentage of the . . . market."

ITT's initial proposal, filed last July, plus a similar one submitted soon afterward by WUI are likely to be considered by the Federal Communications Commission "on or about Oct. 10," a commission spokesman said. If these proposals are approved, international Telex users willing to pay their own access charges could begin saving 60 cent/min about Oct. 18.

The "two-tiered" rate cut initiated by RCA probably will come before the commission "soon afterward" and could go into effect "about Nov. 15," the spokesman said.

Electronic Mail Box Exhibited

By Brad Schultz
CW Staff

SAN DIEGO — Many end users have wanted, but not found, bargain-basement network communications that preclude a need for major staff additions or retraining, message switches and polling capabilities.

After all, what the end user basically wants in data communications is the ability to send, retrieve and process data remotely — not more technical erudition among personnel, nor more sophisticated equipment whose functions management can scarcely comprehend.

Some vendors exhibiting at the recent Telecommunications Association (TCA) conference here hope to meet this demand with what might be called turnkey network configurations. These are unimposing systems that fit a wide range of CPU types and allow

CW
At TCA

nontechnical employees to create and edit messages at on-line terminals.

That is Anderson Jacobson, Inc.'s (AJ) intention with its AJ 410 Electronic Mail Box, exhibited for the first time at the TCA conference. Costing less than $2,000, the micro-

(Continued on Page 34)

Silent 700 Line Gets Printers Operating At 120 Char./Sec

HOUSTON — Texas Instruments, Inc. has added a series of four 120 char./sec data terminals to its Silent 700 thermal printer family.

TI's bidirectional 780 series includes the Model 781 receive-only (RO) printer, the Model 783 keyboard send-receive (KSR), the Model 785 portable and the Model 787 portable. All 780s feature the vendor's recently developed dual-matrix thermal printhead, which reportedly prints two 5 by 7 dot matrix characters with each movement across the page and is designed to run "virtually silently."

The 780s also offer full duplex operation, a receive buffer for data overflow protection and answer-back memory, a spokesman stated. The answer-back memory is capable of storing up to 21 characters in nonvolatile memory for terminal identification to the host computer system.

Further, the 780s come with a full 128-char. Ascii set and a preprogrammed

(Continued on Page 34)

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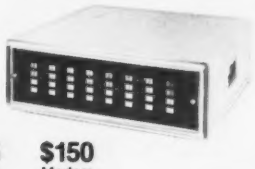

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Electronic Mail Box Debuts as Turnkey Network

(Continued from Page 33)

processor-based AJ 410 can search and edit up to 16K bytes of data in its standard memory buffer. A 32K-byte memory is optional.

The Mail Box delivers full duplex transmission at up to 1,200 bit/sec through ordinary telephone lines or up to 9,600 bit/sec via private or leased lines, a spokesman said. The user would need to add any full duplex, serial asynchronous Ascii terminal to implement one of the four basic network configurations intended by AJ.

The AJ 410 is also reportedly compatible with all AJ, Bell and CCITT full duplex modems. Two ports are featured for connecting asynchronous RS-232C-compatible terminal and external modem. A receive-only port option allows direct transfer of data from the receive buffer to a peripheral device.

A Mail Box configuration permits the terminal operator to prepare messages or data while the box is simultaneously sending or receiving other messages, the spokesman stated.

The featured memory allows the device to search for and retrieve whole messages, single lines or individual words.

The operator may initiate control commands from the terminal keyboard or from the 410's front panel, the spokesman continued. Extra 410 terminal stations may reportedly be added as the need for network expansion arises.

AJ is not the only vendor preparing to market this sort of turnkey network system. For example, Wang Laboratories, Inc. has its Mailway system waiting in the wings [CW, June 11]. However, AJ representatives at TCA called their product the lowest-priced entry now available.

Four-Way Savings

They also described four ways the AJ 410 can trim communications costs.

First, the device can reduce operator training costs because it is simple to operate. The command set resembles English expressions and is accompanied by self-prompting features.

Second, the 410 can reduce data preparation costs — a benefit also attributed to operational simplicity and to such functions as selective tabbing and formatting.

Further, the 410 can reportedly reduce the cost of retransmissions. With AJ's message protocol, error checking and data validation can be done at both ends of the communications link prior to transmission. When retransmissions are required, the 410 handles them automatically.

Finally, the Mail Box was credited with reducing line costs. The box gives users accustomed to 300 bit/sec transmission the greater efficiency of 1,200 bit/sec speeds, the spokesmen maintained.

Although AJ has begun marketing the Electronic Mail Box, deliveries will not begin until November. AJ is located at 521 Charcot Ave., San Jose, Calif. 95131.

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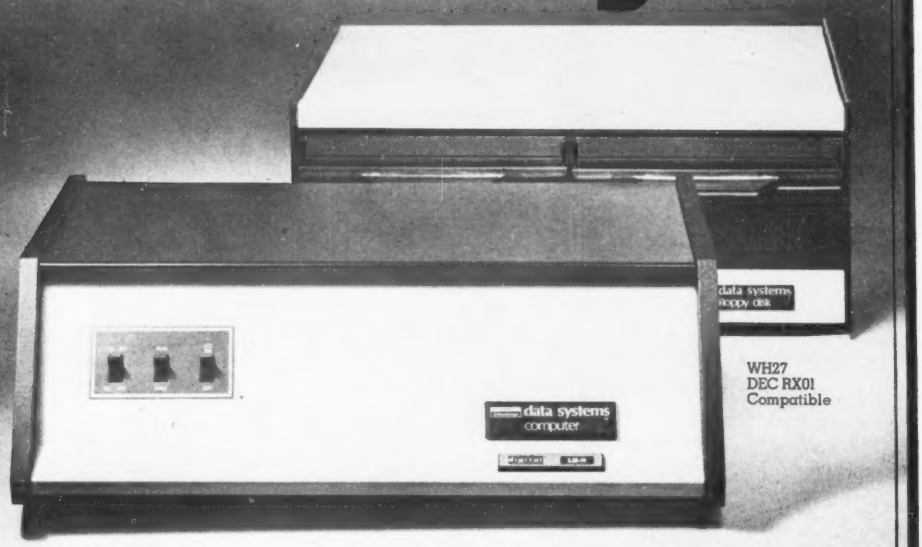

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CP-174

Silent 700 Gets Four Printers

(Continued from Page 33)

self-test diagnostics capability to automatically verify power-up, parity checks and maintenance conditions such as operating parameters status.

The 781 RO and 783 KSR are both desktop units capable of communicating at rates from 100 bit/sec to 9,600 bit/sec and offer a 1,000-char. receive buffer. This buffer and a dc current loop interface are standard.

The 781 RO has an integral operator control keypad for reference and control of parity selection, interface assignments, communications speeds and self-test diagnostics. For high output demand printing, the 781 RO offers a 2,000-char. receive buffer as an option, the spokesman noted.

The 783 KSR is a stationary data terminal that features a typewriter-like keyboard and is aimed at interactive commercial data entry applications.

Both the 785 and 787 portable terminals weigh about 17 lbs each. TI called the 785 unique to the portable terminal market in having a 1,200 bit/sec acoustic coupler. The 787 was called unique for its direct-connect internal originate/automatic answer modem with automatic speed selection.

The 785 and 787 terminals offer an RS-232 interface option for 110- to 9,600 bit/sec communications.

The 781, 783, 785 and 787 cost $1,595, $1,795, $2,445 and $2,895, respectively. For more information, contact TI at P.O. Box 1444, M/S 7784, Houston, Texas 77001.

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TCA Provides the Stage For Communications 'Firsts'

By a CW Staff Writer

SAN DIEGO — At the recent Tele-Communications Association (TCA) conference here, Alanthus Data communications Corp. added two groups of intelligent storage systems to its terminal products family and unveiled a series of communications systems based on smart programmable read-only memories (Prom).

The Alanthus Comm-Storr printer storage system (PSS) and Comm-Storr video storage system (VSS) employ a variety of hard-copy printing devices or CRT terminals in conjunction with either a single or dual floppy disk. Featuring two or three high-speed communications ports, the Comm-Storr PSS and VSS reportedly write data on diskettes in a format that can be read by IBM 3740 equipment. Alternatively, the Alanthus systems can read data generated from 3740 products.

The data entered or sent to the PSS and VSS is stored as files, with individual file names automatically cataloged in a directory, an Alanthus spokesman explained.

After receiving data from low-speed devices, an unattended Comm-Storr PSS or VSS can send batched data at high speed over communications lines and can interact with asynchronous communications protocols, the spokesman continued.

Data Forms Packages

Two data forms packages are offered for both systems: the "Standard Prompted Data Entry" pack, which is claimed to permit easy variable data input onto standard business forms; and the "Forms Data Entry" pack, which is said to provide data validation, range checking and up to 16-digit arithmetic.

The PSS Model 1 is a pedestal printer with speeds up to 30 char./sec. The PSS/1 features a 7 by 7 dot matrix for six-part forms and delivers 132 char./-line. It costs $5,790.

The desktop PSS/2 prints at 10-, 12-, 13.2 or 16.5-char./in. and delivers up to 216 char./line with a 9 by 7 dot matrix head. It costs $5,165.

Alanthus' PSS/3 gives the user 45 char./sec printing with upper and lower case characters. Daisy wheel technology is employed. The cost: $7,310.

Finally, the PSS/4 prints at speeds as fast as 180 char./sec and features a 7 by 7 dot matrix, at a cost of $6,315.

Turning to the VSS line, Alanthus' VSS/1 is called a character-oriented, low-cost CRT terminal that displays up to 1,920 characters and offers switch-selectable speeds of 75 bit/sec to 19,200 bit/sec. The VSS/1 goes for $4,780.

The $5,300 VSS/2 gives a full two-page display an a 90-char. keyboard. The VSS/3 terminal sports up to 132 characters in its format and comes with a detachable keyboard, scrolling and split screening. The VSS/3 is tagged at $5,595.

Micro-Based Series

Alanthus also choose the TCA conference to announce its Envax/1000 series of "microcomputer communication systems." The 1000 series features operator prompting, text editing, automatic line and data insertion, auto dial and redial and operator-controlled encryption.

The Envax/1003 10 char./sec printer costs $2,760. A 30 char./sec printer, the Envax/1004, comes with a 7 by 7 dot matrix print head and sells for $4,025.

The Series 1005 is a 9 by 7 dot matrix printer reportedly capable of printing up to 216 characters per line. It costs $3,580. A "letter perfect, high quality" printer, the 1006, goes for $5,600.

The Envax/1007 is a solid-character printer with selectable speeds of 10-, 30- and 120-char./sec and costs $4,200. For $480 more, the 1008 prints at speeds up to 180 char./sec. Finally, the Envax CRT terminal can display 1,920 characters and costs $3,200.

The Envax 1000s handle such applications as direct interface to corporate TWX, Telex, direct distance dialing and private line networks, Alanthus stated. They also reportedly handle text editing, word processing and electronic mail tasks.

Line Concentrator

The TCA meeting was also the occasion for Micom Systems, Inc.'s introduction of the Micro300 line concentrator. Designed for use with multiplexing polled asynchronous terminals, the Micro300 is said to allow four or eight multidrop lines, each supporting polled terminals at speeds as fast as 1,800 bit/sec, to be combined down a single line running synchronously at up to 4,800 bit/sec.

No changes to existing hardware or software are required, Micom maintained. A four-channel version of the Micro300 costs $1,750, while an eight-channel version goes for $2,750.

Also at TCA, the Garland Division of E-Systems, Inc. took the wraps off its LPC-24 speech processor. This system reportedly gives the user both voice and data on the same communications line.

In operation, the LPC-24 receives a conventional telephone's audio signals, samples them and analyzes them using techniques of linear predictive coding. The resulting output is a synchronous 2,400 bit/sec stream of bits called compatible with an RS-232 or Mil-STD-188 interface.

At the receiving LPC-24 unit, the reverse process is engaged, a Garland spokesman explained. The processor is mainly intended to improve the efficiency, security and flexibility of telecommunications networks. In the U.S., it costs about $10,710.

Codex Corp., the wholly-owned subsidiary of Motorola, Inc., picked TCA as the place to announce a marketing agreement with Time and Space Processing, Inc. of Cupertino, Calif.

The deal gives Codex exclusive international marketing rights, except in Japan, to sell Time and Space Processing's TSP speech digitizer, which converts voice into a 2,400 bit/-sec signal that can be multiplexed with data or other digital voice signals.

Alanthus is located at 6011 Executive Blvd., Rockville, Md. 20582. Micom is at 9551 Irondale Ave., Chatsworth, Calif. 91311. The address of E-Systems' Garland Division is P.O. Box 226118, Dallas, Texas 75266. Codex can be reached at 20 Cabot Blvd., Mansfield, Mass. 02048.

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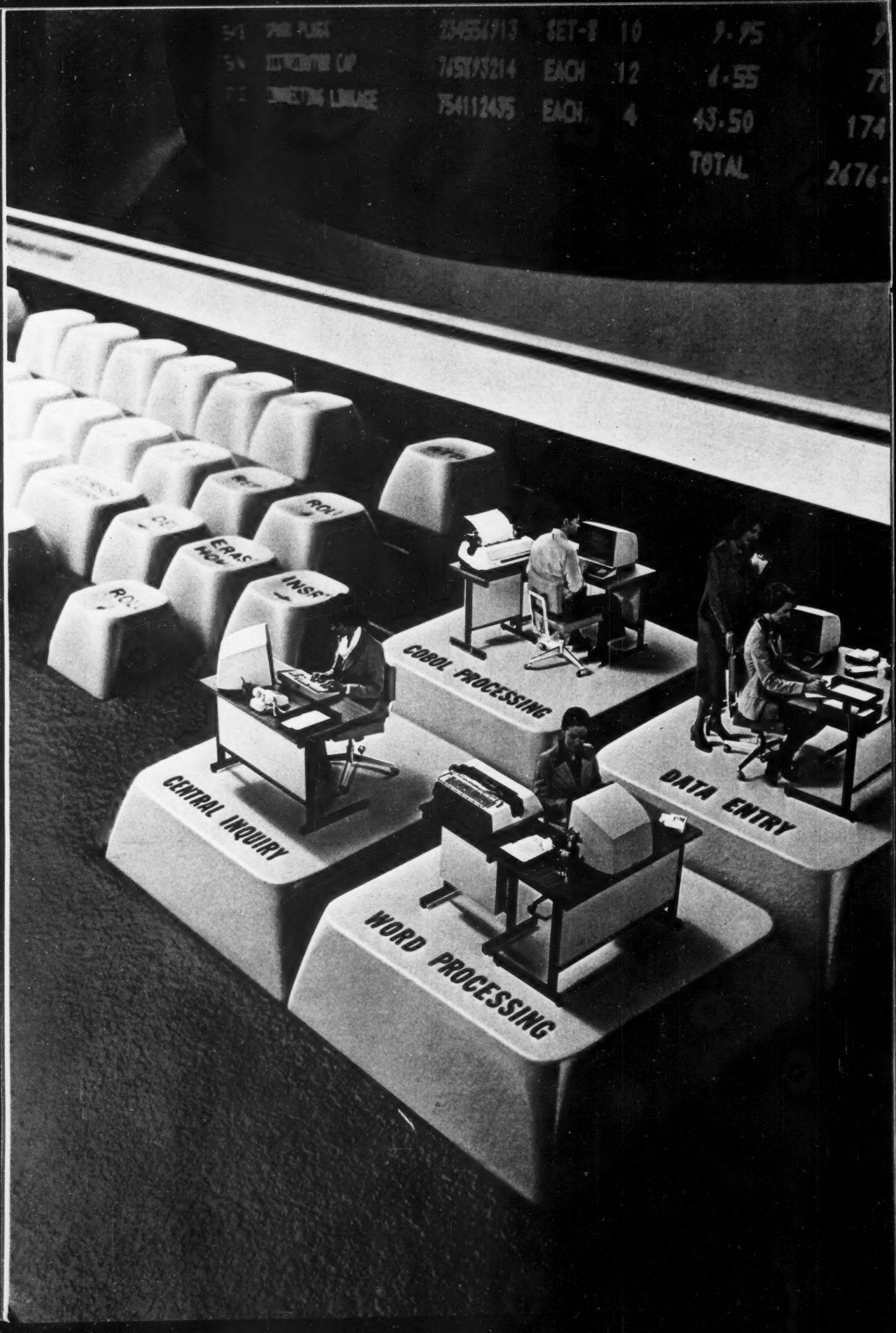
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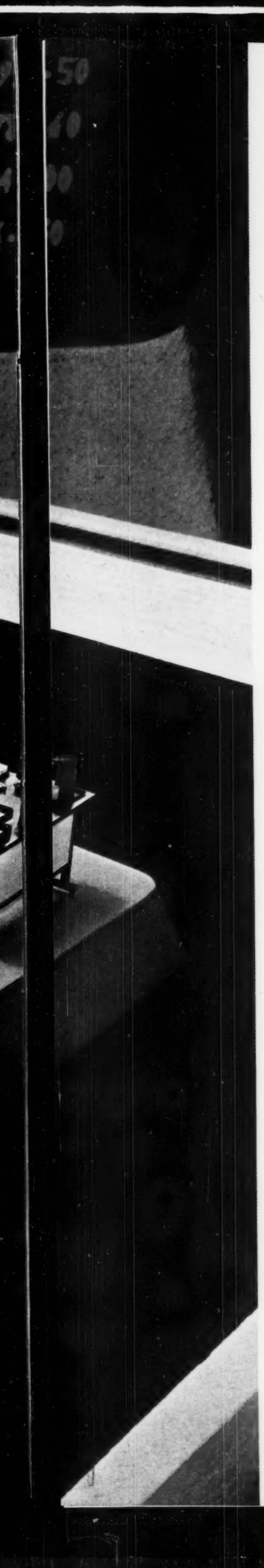

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Writing Tablet Uses Handwritten Data Entry

TEMPE, Ariz. — An electronic writing tablet system that uses ordinary handwriting in place of conventional data entry via a keyboard terminal is available from Kurta Corp.

The Kurta Quil terminal also permits transmittal of graphic and alphanumeric information over standard telephone lines for remote reproduction, a spokesman said.

The system includes a graphic media tablet enclosed in a single console, a processor and a thermal printer. The Quil is said to require no keyboard or special language training and to accept several modes of written input for processing in a variety of ways.

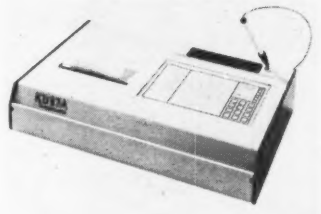
In the "writing" mode, the Quil sends data to a CPU from a sheet of paper laid on the Quil tablet surface. This data is transmitted directly or indirectly over telephone lines while hard copy is provided to the user, the spokesman explained.

In the "mark sense" or "menu" mode, the Quil's pen checks off selected items on a preprinted form affixed to the tablet surface, the spokesman continued.

The Quil's "emulation" capability reportedly results in acceptance of such input as if it were word-for-word keyboard entry, permitting the check mark to represent detailed data input. This input can be stored or used to create a CRT display or "exact-copy" paper printout at a local or remote location, the spokesman added.

The Quil can generate sketches, drawings, diagrams and legal signatures, he maintained. Its compatibility with large digital communications systems reportedly makes possible a broad range of data entry applications, including order entry, medical authorization, computer-aided design, weather data dissemination and other commercial and scientific tasks.

Quil terminal configurations range in cost between $900 and $2,900. Kurta is located at Building 102, 2202 S. Priest, Tempe, Ariz. 85282.



The Kurta Quil Terminal

With Workstation I

IBM, HP Devices Simulated

SPRING LAKE PARK, Minn. — An intelligent CRT terminal that can operate either as an IBM 3270-type or Hewlett-Packard Co. 2645A-type terminal has been introduced by Communications and Special Software, Inc. (CSS).

The CSS Workstation I can communicate with the IBM host as an IBM 3275 or can be daisy-chained to simulate a 3277 on a remote 3271 controller. All functions of the 3270 are supported, and the unit incorporates Ebcdic bisynchronous protocol to the host, emulating a 3275, CSS said.

In a remote mode, the terminal can communicate to a mainframe via teletypewriter, synchronous or other protocols. In that mode, the terminal's capability for process editing, forms, data logging and other functions is taken from the HP 2645A, according to CSS.

Eight function keys are provided that can be programmed either by the operator or from the host machine. On a 1,920-character, 24-line by 80 char./-line screen, the Workstation I can display enhancements such as underline, blink, fields and two alternate 128-character display sets other than the standard Roman characters.

For communications to an alternate host, point-to-point/multipoint, synchronous/asynchronous and Ebcdic/-Ascii options are available. In local mode, the unit can test not only its own 30K bytes of read-only memory and 16K bytes of random-access memory, but performs loopback tests on lines and modems, CSS declared.

Optional 110K-byte dual cartridge units (for use in the local mode with the HP mainframe) and an 180 char./-sec printer allow the Workstation I to work as a stand-alone system. Delivery is scheduled for February.

The Workstation I costs $5,200 from CSS at 8406 Center Drive, Spring Lake Park, Minn. 55432.

Modem Eliminator Ties Terminals, CPUs

WOODBURY, N.Y. — Direct connection between terminals and CPUs is offered by Remark International's Model 30 modem eliminator, which is said to eliminate the need for short-haul modems or acoustic couplers where limited distance is involved.

The static device does not require ac or dc voltage and transposes the following signal pairs: transmit data (TD) and received data (RD); request to send (RTS) and data carrier detect (DCD).

The Model 30 costs $35 from the vendor at 4 Sycamore Dr., Woodbury, N.Y. 11797.

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President, Almadén Vineyards

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You've heard about Model 3276—IBM's new, small mini-cluster addition to their 3270 Series—and you're probably impressed by the price when compared to IBM's large cluster system.

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Features and enhancements. Their mini-cluster system has loads of features. Ours has more. Here's a sample: 1) Trivex In-terminal Diagnostics to help pin-point problems in your network and eliminate finger pointing if a network goes down. 2) Upper/lower case characters. 3) Cursor Position Indicator with Data Content which gives the operator the last display information in hexidecimal code to speed program debugging or checkout. 4) Lite Pen. 5) Blinking cursor. 6) Switch-selectable 480/1920 character displays. Of course, the Trivex 0712M Mini-Cluster Display System is completely IBM plug-compatible and will support both Trivex and IBM displays and printers.

Lower cost. If money were no object, you'd probably choose the advantages of the Trivex system. But the beauty of our system is that even if money is a very big object, you can still choose Trivex. Because we cost less than our IBM competition. Substantially less.

If you've heard enough, at least enough to pique your curiosity, then take the next step. Call, write or TWX us at Trivex. We'll get more facts about the 0712M into your hands. Then you can decide: Trivex advanced features, competitive price and speedy delivery? Or waiting for Old Bossie to come home?

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TRIVEX 3180 Red Hill Ave., Costa Mesa, CA 92626. Phone (714) 546-7781. (800) 854-3810 or 854-3819. TWX (910) 595-2589. Offices in Los Alamitos, CA (213) 594-9502/San Francisco, CA (415) 386-6344/Oak Brook, IL (312) 325-8108/Detroit, MI (313) 352-2870/Ft. Lee, NJ (201) 461-4712. In Europe: Brussels, Telex: 84661085, Phone: 02513-4543.

'Little' Problem Forecast in Remote Data Flows

By Rex Malik
Special to CW

GENEVA, Switzerland — The remote sensing of earth resources is beginning to create a "little" problem — a problem of data flows between satellites and ground stations — if the data is to be processed in anything resembling real time.

This was the view of Pietro Masarati of Italy's SCS SPA, speaking at the International Telecommunications Exhibition and Forum (Telecom '79), which opened here recently.

To cover an area of 10,000 square nautical miles, a "typical" high-resolution remote sensing system handles about 4.5G bits of data in an average day, Masarati observed. This estimate presumes repetition of the sensed data every three days.

Therefore, for a country containing 20 of these basic areas, the daily data flow is about 90G bits. If the flow continues 24 hours a day, a channel operating at a continuous speed of 1M bit/-sec is required.

Given that the systems of the near future are going to provide visible and infrared earth observation, an active and passive microwave all-weather survey system, a large-scale weather survey system, earth energy-budgeting monitoring of atmospheric and stratospheric constituents, sea survey and tropospheric monitoring, it seems not unreasonable to forecast a raw data flow larger than 10G bits from polar orbiting satellites alone, Masarati said.

It is worth pointing out that a transmission capability of log bits implies the use of more than 80 transponders, each operating at rates of 120M bit/-sec.

If one considers a global system, the data has to be distributed to the participating countries. If 100 by 100 blocks are the basic units — and it fits the sensing technology — one can foresee such a system having a data flow, not capacity but actual, of no less than 15G bits per day by the end of the century, the speaker continued.

If you think once more of a country composed of 20 of the basic blocks, you can get up to 300G bits per day, once you start totaling the numbers for all the countries involved, he said.

Econo-Call May Trim Costs

SAN DIEGO — A means of trimming telephone costs that may serve data communications users was introduced at the Telecommunications Association conference by TDX Systems, Inc. The Econo-Call telephone service is aimed at users spending up to $8,000/mo on long distance tolls.

With Econo-Call, long distance calls are routed to any of more than 50 major markets through a network of foreign exchange (FX) lines and other common carrier (OCC) facilities such as MCI Communications Corp., Southern Pacific Communications and ITT.

For a charge of 19 cent/min, the user may dial a 22-digit number for each call. For a charge of 22.5 cent/min, only a 10-digit number would be involved.

TDX Systems is located at 1920 Aline Ave., Vienna, Va. 22180.

Telex Products Printers Fit IBM 3287s

TULSA, Okla. — A pair of IBM 3287-compatible printers that reportedly offer high-quality output from data sent by Telex Products, Inc.'s TC 276 or IBM 3274 or 3276 terminal controllers are available from Telex Products.

Both TC 286B Models 1 and 2 feature daisy wheel print elements. The Model 1 operates at 45 char./sec and has a plastic print wheel, while the Model 2, intended for IBM's Automated Text Management System (ATMS), uses a metallized print wheel operating at 40 char./sec.

Further, since each printer can store text in a buffer ranging in size from 960 characters to 3,440 characters, it can print at speeds up to 70 char./sec by "looking ahead" and skipping blank spaces in the text, according to a Telex Products spokesman.

The printers are the only non-IBM printers on the market that can be attached as one of the 32 workstations of an IBM 3274 controller, he claimed. Both units print 132-character lines, 6- or 8 line/in. and 12 char./in.

The TC 286B Models 1 and 2 cost $5,400 and $5,700, respectively. Telex Products is located at 6422 E. 41st St., Tulsa, Okla. 74135.

Codex Modem Family Grows

MANSFIELD, Mass. — Codex Corp. has added a Bell-compatible 4,800 bit/-sec modem to its MX modem family.

The microprocessor-controlled MX 48A/B incorporates both leased line and dial operation capabilities in the same unit, reportedly providing users with more flexibility in network design and less need for spare parts.

The modem is called line-compatible with Bell's 208A, 208B and equivalent modems and able to support both leased line multipoint and point-to-point as well as dial applications.

The unit costs $3,900 and leases for $110/mo, $90/mo or $85/mo on one-, two- and three-year plans.

Deliveries are slated to begin early next year, Codex said from 20 Cabot Blvd., Mansfield, Mass. 02048.

Attention—Operators and Systems Programmers:

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Monday	October 29	Washington, D.C.
Tuesday	October 30	Cherry Hill, New Jersey
Wednesday	October 31	Boston
Thursday	November 1	New York
Friday	November 2	New York

Agenda

Morning—For Operators
Introduction
—Overview of Monitoring Methods
—Background versus real-time monitoring
—Problems with real-time monitoring
—OMEGAMON approach to monitoring
OMEGAMON Exception Analysis
—Why jobs are waiting
—Monitoring TSO response problems
—Catching looping jobs and TSO users
—Reasons for console lockouts
—Explanation of enqueues and reserves
—Hardware problems

Afternoon—For Systems Programmers:
Advanced Techniques for Exploring MVS Internals
—Monitoring disks: arm contention, reserves, page data sets
—Analyzing CPU utilization
—Address space analysis
The SRM (System Resources Manager)
—Introduction to the SRM
—Investigating the SRM
—Case histories of MVS monitoring experiences

For More Information:
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Morning Session _____
Afternoon _____
City _____
Day _____
Number attending _____

Name _____
Title _____
Address _____
Company _____
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Zip _____ Phone( ) _____

Seminar to Focus on Cryptography

NEW YORK — Recently developed cryptographic techniques for protecting transmitted and stored data will be discussed at a seminar here Dec. 3-5.

Sponsored by Cryptotech, the seminar will feature talks by Carl H. Meyer, who helped develop the federal government's Data Encryption Standard; MIT Prof. Ronald J. Rivest, inventor of a public key-encryption algorithm; and Stephen T. Kent, a researcher concerned with applying encryption to communications protocols.

Digital Signatures

The seminar will cover state-of-the-art techniques to authenticate messages and system users and to generate electronic digital signatures, Cryptotech said. Such methods are relevant to electronic funds transfer and electronic mail applications.

Other topics will include key generation and implementation of key management for end-to-end generation.

Registration costs $655 for the three-day event to be held in The Halloran House, 525 Lexington Ave., New York, N.Y. 10017. For further information, contact Herge Jansen, the registrar, at Cryptotech, 12 Station Rd., Bellport, N.Y. 11713.

Net Ties New Zealand, U.S.

CUPERTINO, Calif. — New Zealanders with standard terminals can now be reached through Tymnet, Inc.'s packet network to Tymnet-connected computers in the U.S.

The addition of New Zealand brings to 26 the number of countries that can access Tymnet-connected computers and services.

Access was extended with service provided jointly by RCA Global Communications, Inc. and the New Zealand Post Office. The service is available throughout New Zealand, with local call access in Wellington, the capital city.

Charges for the service from New Zealand include a connect charge of 20 cents per minute and 60 cents per thousand characters from Tymnet at 20665 Valley Green Dr., Cupertino, Calif. 94014.

What's in a name?

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Incorporating the latest *confidence* and *convenience* features of our Series 3000 Line Printers, the HETRA Mark V RO Terminal provides remarkable Reliability and Maintainability, outstanding Print Quality and unparalleled Ease of Operation. These printers also supply the medium/high speed output you need, with up to 760 LPM available on the Model 3200 and up to 1500 LPM on the Model 3300.

In operation, the Mark V RO Printer acts exactly like a 3780 Terminal, performing all data transfers to and from the host computer. And the user, or operator, controls the flow of print jobs and the display of job queue information using the standard HASP, JES or ASP commands selected and transmitted from the extensive Communication Command Console.

What's more, our nationwide Customer Services Organization backs up every HETRA product with timely and responsive delivery, installation, training, documentation, and repair and spares support. Toll-free service lines to Corporate Headquarters give you immediate, 24-hour-a-day access to HETRA's centrally-dispatched customer services organization.

The Mark V RO 3780 Print Terminal is just one example of HETRA's unique blend of innovative hardware designs coupled with sophisticated data communications software. A full line of Mark V simulators, including IBM 2780, IBM Multi-Leaver, Univac 1004, Univac NTR, and CDC-U200 simulators, will soon be available.

To learn more about us, write **HETRA, Post Office Box 970, Melbourne, Florida 32901,** or call **(305) 723-7731.**

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Confidence and Convenience for Computer Users.

Mark V RO 3780 Print Terminal

CRT Offers APL, Ascii

MISSISSAUGA, Ont. — A microprocessor-based Ascii/APL CRT terminal that features true overstrikes using a 9 by 13 dot character cell is available from Cybernex Ltd.

The APL-100 has a 1,920-char. screen with an 80-char. by 24-line display. A 32-char. split screen mode allows the user to scroll 48 lines from bottom right to top left.

Standard features in both the APL and Ascii modes include read-and-write cursor address, page print and printer port on/off control. A buffered parallel printer port is standard on the terminal, and an auxiliary buffered serial port is optional.

The standard 82-key keyboard has special keys for a variety of editing functions. A 15-key numeric pad features a shifted mode that provides four-direction cursor control keys.

Ten transmission speeds can be selected, from 75- to 19.2K bit/sec. The RS232C main port is equipped with an active and passive 20 mA current loop. Cost is $1,795 (Canadian) from the vendor at 2183 Dunwin Drive, Mississauga, Ont., Canada.

Interfaces for Printer Allow Remote Control

WEST MELBOURNE, Fla. — Communications interfaces for Florida Data Corp.'s (FDC) PB 600A 600 char./sec printer reportedly allow the printer to be controlled remotely from a variety of terminals.

Interfaces are immediately available for IBM 2770, 2780, 3270 and 3780 terminals. Interfaces for Burroughs Corp. and NCR Corp. Poll and Select, Honeywell, Inc.'s VIP 7700 and RLP 300 and Univac DCT 1000 units are also available, FDC said.

The interfaces can be checked for compatibility over dial-up lines to a remote diagnostic facility before hookup to the host computer.

Cost is $1,100 factory installed, more if field-installed, according to FDC at 3308 New Haven Ave., W. Melbourne, Fla. 32901.

Megadata Software Has 83B3 Protocol

BOHEMIA, N.Y. — The 83B3 communications protocol, used extensively by airlines for message-switching applications, has been incorporated into the basic software package of Megadata Corp.'s 2001 workstation.

The 2001 workstation can now be ordered with 83B3 as the user's choice for communications protocol, or 83B3 may be purchased separately for $1,000.

The vendor is at 35 Orville Dr., Bohemia, N.Y. 11716.

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The Tempo system is the better way because it displays response time data for each transaction at the end-user's location *and* transmits that same information to the host for analysis by systems management.
The result: you have information to solve your response time problem. You get all the benefits of increased productivity and expanded cooperation between management and end-users. And you get improved system performance. With the Tempo Response Time Monitor System from DTSS Incorporated. Designed for use with IBM 3271/3277 remote configurations, the Tempo monitor solves a "host" of problems.

Now, Response Time is Quantifiable and Readily Available
Response time is the period of time between an operator hitting the "enter key" and the notification of "system available" for further input of data. A simple definition. A complex problem, when the information which is available to the remote user and the host system are different, or when it is not available at either or both locations. This information gap can result in differences of opinion which obscure the real goal: improving system performance so that everyone benefits.

With the easily installed Tempo unit, information is displayed for the end-user and transmitted to the host system for collection, filing and analysis. The low-cost Tempo unit simply plugs into any 3277 in less than a minute. Response time then ceases to be a matter of opinion and becomes a subject of rational discussion.

Increases Productivity
The productivity of end-users directly correlates to the response time of the system. Over a complete day, average response time delays of even a few seconds per transaction will have significant impact on overall productivity of personnel. By providing credible information on response time, the Tempo unit pays off in increasing productivity.

Expands Cooperation Between Management and End-Users
The Tempo unit not only monitors response time, but also produces reports at the host computer which inform both management and users as to the actual response time for each terminal transaction. The data is analyzed by the host and may be displayed in terms of the percent of time that response time meets the required parameters over the measured period. As a result, management and end-users have a common information base from which to discuss how to improve system performance rather than whether response time is "good" or "bad."

Improves System Performance
The greatest benefit of all, then, is that when certain terminals are in fact identified as having slow response time, the system can be "tuned" to accomplish improvements. System performance can be analyzed by terminal, line, application, and load to pinpoint areas of potential improvement.

We Built It Because We Needed It
Our parent, Metropolitan Life Insurance Company, which uses hundreds of 3270 terminals, knew it needed response time measurement. But no one could provide the required capability. So Metropolitan people built it themselves. And since Metropolitan has been using the unit, they have been able to improve response time dramatically.

If you have the same need, and if you would like to know more, please return the coupon below to Bill Way, Tempo Product Manager. He'll be in touch.

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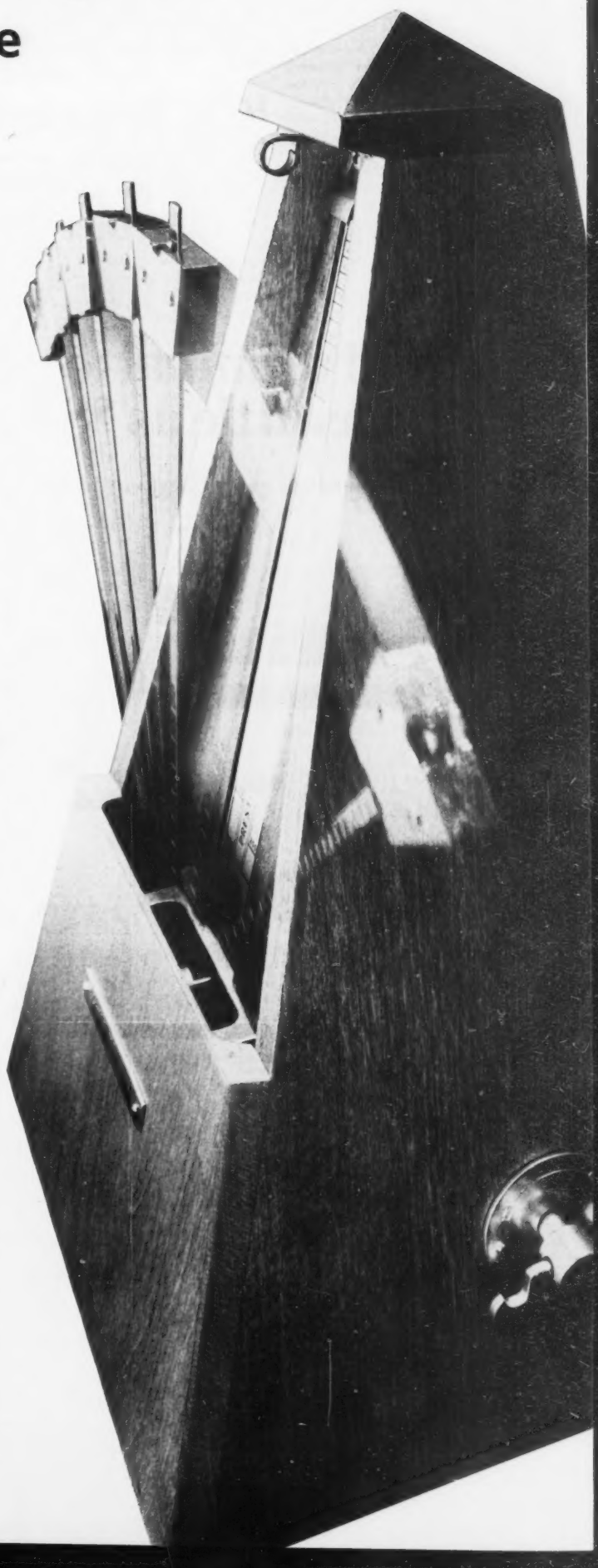

Dear Bill:
Please send me more information about the DTSS Tempo Response Time Monitor.

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My Network Configuration is as follows:

Host CPU _____ Number of 3277 Displays _____
Operating System _____ Other Displays _____
Number of 3271 Controllers _____ Number of Communications Lines _____

Return to DTSS Incorporated, 10 Allen Street, Hanover, NH 03755.

Protocol Converter Debuts

UPPER ST. CLAIRE, Pa. — A protocol converter that reportedly emulates the protocol presented by IBM 2770, 2780, 3780 and 3741 remote job entry terminals is available from Expandor, Inc.

The Model A/S-1 provides a communications interface between an asynchronous terminal and a bisynchronous communications device to look like the protocol presented by the IBM terminals, according to the vendor.

With an asynchronous data rate of 110- to 9,600 bit/sec, or a bisynchronous rate determined by the synchronous modem or modem eliminator, the A/S-1 provides a two-way communications path converting asynchronous Ascii to bisychronous Ebcdic (and reverse).

Further, no operator intervention is required to operate the unit because firmware programs are stored in a nonvolatile read-only memory so it is ready to run when turned on.

The converter costs $1,495 with a 30-day trial plan from Expandor, 400 St. Claire Plaza, Upper St. Claire, Pa. 15241.

ICA Reorganizes Board

ROCHESTER, N.Y. — The International Communications Association (ICA) has reorganized its board of directors.

The association's top officers now include Wylie R. Deakin of TRW, Inc., president; Lloyd R. Isaacs of Chrysler Corp., first vice-president; Walter J. Heide of McGraw-Hill, Inc., second vice-president; and F. Graham Crawford of Sears, Roebuck and Co., treasurer.

Bernard W. Overeynder of Xerox Corp. is secretary.

George E. Fallat of duPont de Nemours and Co. resigned from the board upon his transfer to Switzerland.

For Port Selector

Micom Adds Log Option

CHATWORTH, Calif. — Micom Systems, Inc. has unveiled a statistics log output option for its Model 610 intelligent port selector that allows the device to maintain time and duration statistics of interactive minicomputer or time-sharing systems.

Driven by one or more computer systems, the option keeps track of successful user connections as well as the time and cause of each unsuccessful attempt to access the system. The logging unit can be used for accounting purposes or to develop detailed statistics regarding system utilization in multiple-resource on-line computer installations, Micom said.

The option can be installed in either the 610 Model 1, which was designed for single-computer installations, or in the floor-standing Model 2 intelligent port selector, which can support up to 1,000 terminals and computer ports.

The unit costs $500. Micom is at 9551 Irondale Ave., Chatsworth, Calif. 91311.

Cardamation Adds Card Reader

FRAZER, Pa. — Cardamation Co. has released an 80-column card reader for use in communications as fast as 19.2K bit/sec.

The CR300/92 reader provides input through conventional telephone lines or to the host processor, via an RS-232C serial port, at a 300 card/min pace. It is billed as an alternative to Documation, Inc.'s M200 reader and carries a tag of $3,750, compared with the latter's $5,845 list price.

Cardamation's address is P.O. Box 746, Frazer, Pa. 19355.

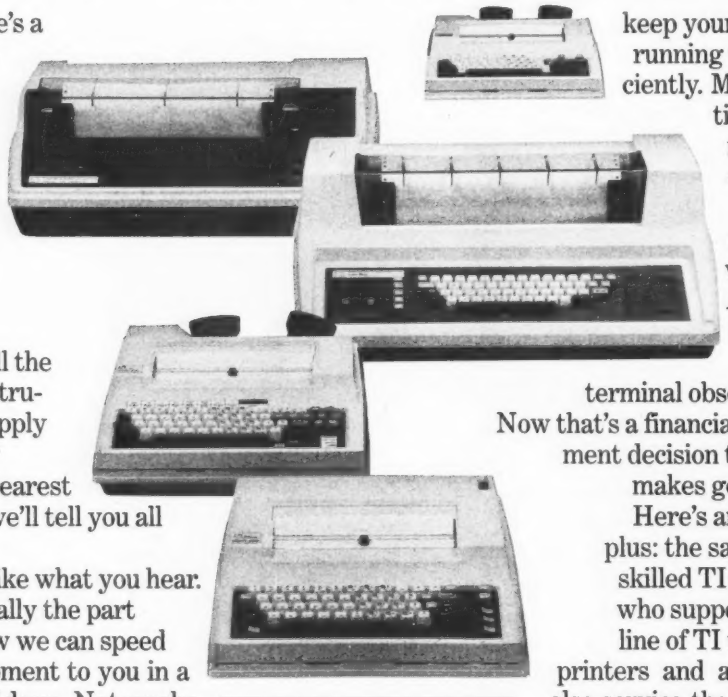
Avanti Offering Module Cages

NEWPORT, R.I. — Users of Avanti Communications Corp. modems, modem eliminator/driver modules or repeater/driver modules can now order up to 10 of them in a compact "cage."

The cages are priced from $425 to $500 depending on the particular model required. Avanti can be reached at Acquidneck Industrial Park, Newport, R.I. 02840.

Put a TI terminal to work for you. For as little as $85 a month.

Texas Instruments Supply Company offers a new leasing program.



Now there's a fast, easy and economical way to put a new TI terminal to work in your office.

Just call the Texas Instruments Supply Company location nearest you and we'll tell you all about it.

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One terminal. Or more. For as short a term as ninety days. Or as long as four years.

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Here's another big plus: the same highly skilled TI personnel who support the full line of TI terminals, printers and accessories also service the lease machines.

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743 KSR Data Terminal	$ 85.00
745 KSR Data Terminal	$100.00
763 Data Terminal with Bubble Memory	$125.00
765 Portable Data Terminal with Bubble Memory	$140.00
810 R/O Printer	$110.00
820 KSR Data Terminal	$138.00

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Tymshare Director Says Yes

H Series: Three Times Better Than 30?

By Jeffry Beeler
CW West Coast Bureau

ANAHEIM, Calif. — IBM's anticipated H series systems will offer two and a half to three times the price/performance of the 30 series and will provide a "high-speed" bus incorporating fiber optics, according to Robert Colten, director of Tymshare, Inc.'s productivity systems planning operation.

The high-end 370 series replacements will also incorporate a data base processor and an associative memory that takes advantage of magnetic bubble technology, Colten predicted recently at the Mini/Micro conference and exhibition here.

Moreover, he added, the H series machines will be a multi-processor line that will aim to simplify IBM's operating system by dedicating CPUs to selected tasks.

IBM's commitment to its Systems Network Architecture (SNA) and Synchronous Data Link Control (SDLC) will continue for another six to eight years, Colten predicted at a two-hour session titled "IBM Watching."

Colten expects IBM to extend its 4300 line of mainframes with additional offerings that will surpass the 3031 in performance. This prediction followed a similar one made earlier in the session by John Rehfeld of International Data Corp. However, Rehfeld said the anticipated IBM machine would only equal, not exceed, the 3031's performance.

Rehfeld, who estimated the high-end 4300 system's price at $1 million, also reiterated an earlier prediction that IBM would soon enhance the performance and cut the price of its 30 series processors [CW, Sept. 24]. That announcement would be followed nine months later with the announcement of IBM's long-awaited H-series, he predicted.

Advent of 'Whitney' Disk

In other remarks, Colten forecast the introduction of IBM's "Whitney" disk system sometime in 1980. That product will store 1G byte compared with 571M bytes for the 3370 disk unit, which was introduced earlier this year alongside the 4300 series system.

The Tymshare executive also predicted a growing rivalry between IBM's Data Processing Division and General Systems Division and warned that the internal competition would produce some overlap in the two organizations' product lines. Colten likened the overlap, which he attributed to IBM's growing "GM-ization," to the duplication in General Motors Corp.'s competing Oldsmobile and Chevrolet lines.

In a later presentation, Lawrence Dietz, president of Strategic Business Services, described IBM's recently announced 8100 "distributed processing" system as suitable for the same class of applications as the firm's older 3790 cluster controller. Unlike the System/38, Dietz said, the 8100 was intended to be used by relatively unskilled DP personnel and thus is expected to allow users to concentrate their most competent computing staffers at the corporate level.

On a somewhat different subject, Ted Lorber of Datum, Inc. predicted growing IBM support for the long-neglected Series/1. The industry giant gaffed several years ago, Lorber said, when it introduced the small business system virtually without support.

IBM's subsequent efforts to correct its mistake have given Series/1-compatible peripheral suppliers a de facto stamp of approval and will help make the firm one of the top minicomputer vendors by the mid-1980s, according to Lorber.

For Only 6% Hike in Salaries, Bank Gains 18% Throughput

By Howard A. Karten
CW Staff

NEW ORLEANS — An incentive pay system at the Chase Manhattan Bank N.A.'s Consumer Credit Division in New Hyde Park, N.Y., gave the bank an 18.5% increase in throughput with only a 6% increase in operator salaries, according to a speaker at the Third Annual Data Entry Management Association (Dema) meeting here recently.

Under the system — which is entirely voluntary — data entry personnel who participate are given cash bonuses for work above a standard quantity.

For example, the basic pay for an operator is approximately $40/day, for which the bank expects an output of 1,950 records per employee. If the employee participates in the incentive program and enters an additional 1,700 records during a shift, he earns an additional $20. This is a near-doubling of output for only a 50% increase in wages, Robert R. Aglialoro, a second vice-president with Chase, pointed out.

Aglialoro explained to a near-capacity crowd that the system he installed was designed to measure both effectiveness and efficiency. Effectiveness, which the bank measures as the total number of records entered per shift per operator — is a measure of quality, he said, whereas efficiency is a measure of hourly performance.

The division's key-entry personnel were given the choice appproximately 15 months ago of either remaining on straight salary or switching to the incentive system. They can switch back at any time, but no one has yet exercised this option.

Out of 74 employees, 22 elected to switch to the incentive system. Chase's Four-Phase Systems, Inc. System IV/90 tracks the production of each of those employees on every shift. To Aglialoro's knowledge, it has never permanently lost any productivity or other data.

Initially, there were two negative perceptions of the system — that the plan was a "ruse", designed to provide "survival of the fittest" and weed out less productive employees, and that eventually the productivity standard for each incentive level would rise, forcing the data entry personnel to work harder to achieve the same incentive pay.

Asserting that neither of these fears is true or justified, Aglialoro claimed that only two employees left the program. One was transferred and promoted, and the other left to have a baby.

The different performance levels associated with different incentive amounts were determined empirically, by tabulating operator output before instituting the system. This figure was then adjusted somewhat.

CW At Dema

Despite an "audit" by a behavioral research firm into the operation, Aglialoro was unable to explain clearly why some operators elected not to participate in the incentive program, despite the fact that it could have been to their financial advantage.

Installing the incentive pay system reduced the division's dependence on a service bureau for data entry, he observed. The service bureau operation was three times as costly as engineering data in-house.

Target Applications

"Applications high in volume and low in complexity are the best candidates for an incentive system," Aglialoro stated.

To bring its operation as close as possible to these characteristics, Chase attempted to reduce as much as possible decisions that have to be made by operators. An example

(Continued on Page 47)

Psst — Wanna Buy An AS/5?

By Tom Henkel
CW Staff

PASADENA, Calif. — Life is full of surprises, and Art White got one when he decided to sell his Itel Corp. AS/5-3 mainframe.

Three days before his ad ran in the Sept. 27, *Wall Street Journal*, Itel announced that National Semiconductor Corp. is taking over the mainframe segment of the troubled company [CW, Oct. 1].

However, the president of Wells Fargo Realty Services Co. said the transfer has to improve his bargaining position — because it sure can't get much worse. The firm has been trying for weeks to sell the AS/5-3, and so far there haven't been any takers.

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"I'm hoping [the transfer] will enhance the salability. I look at it as a positive development opposed to the continued notoriety that's been associated with Itel operations. If anything, it provides some element of longevity and permanance to the maintenance of units out there. Of course, I've got to be optimistic about it," White said.

"We've been trying to sell the damn thing and it's very difficult. The response has been that 'the Itel is worthless,' he added.

Insisting the AS/5-3 is a good machine, White said his firm is selling it on orders from top brass at the firm's parent company, Wells Fargo Bank. Company leaders saw the main company's DP center had some extra capacity in its IBM 370/158 and, maintaining efficient to do all computing at the main DP center, ordered White to sell the mainframe.

"We'll lose hundreds of thousands [of dollars]. The IBM peripherals are probably worth more than the [mainframe]. If we can get to $300,000 for the whole setup, we'll feel very fortunate," White said. "We're sitting here trying to market something under the worst circumstances."

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DDP: Whys and Whens — Part 3

Placement of Data Depends On Protection and Updating

By A.L. Scherr
Special to CW

At the same time a user considers whether to go with horizontal or vertical distribution, the placement of data must be determined. The choices are primarily centered around data protection and the frequency of updating.

When multiple copies of data are required, the particular form chosen for the communications necessary to synchronize data copies across two or more nodes is a function of the following two goals: (1) minimizing reprocessing at each of the nodes that contain data copies and (2) minimizing the level of communications overhead.

There are also two choices of communications mode: (1) communicate immediately as changes occur or (2) communicate changes all together in a batch, periodically.

The batch approach has the potential for the greatest efficiency, but it does not provide data currency. The choice must be made on the basis of the need to have access to up-to-the-second information.

Given that access to constantly current data is a requirement, there are two further alternatives. Multiple copies of the data can be kept in synchronization by immediate communications among nodes, or a single copy of the data, kept in one node, can be shared by all users.

The single-copy alternative can be more efficient than the multiple synchronized-copy approach if there is a high level of record updates relative to read-only access and if the access time to the data for remote applications is fast enough for acceptable response times.

Thus, the following two parameters describe the nature of communications to nodes in the networks:

1. The form of communications used:
- Batch.
- Interactive

2. The request-response content of the communications:
- Input messages-output messages (i.e., the front end processor approach).
- Data request-date records (i.e., the back-end processor approach).
- Application-defined messages (i.e., any communications not in the pure forms of the first two types).

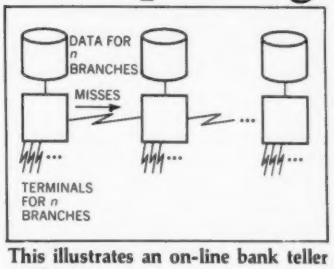
Although the terms "front-end processor" and "back-end processor" imply a static assignment of function to a particular processor, this in not necessarily the case. Two or more forms of communication can occur between any two processors in the system as different aspects of the application programs are activated.

The major considerations that lead to preferring the assignment of a static role to a node in the network are the availability of data and operating system functions in that node, both of which are static choices in themselves.

Adding Applications

Generally, adding applications to a distributed system creates new uses for, and new relationships among, existing data. As a result, the overall systems design may have to be changed to remain viable.

Consider an on-line bank teller application. The accompanying figure shows one possible configuration. The example is a three-stage growth scenario in which the third stage reestablishes a relationship between the first two.



This illustrates an on-line bank teller application

Once you've decided a distributed or decentralized data processing (DDP) system meets your needs, how do you decide where to place the data so it will be useful as well as secure? In Part 3 of this four-part series, the author discusses some factors that govern data placement.

The approach selected for the implementation is a horizontal distribution in which the branch terminals are connected to a particular machine that holds the data associated with the accounts in those branches.

The probability that a transaction requires access to data in another node is a key parameter in the design. This probability is referred to as the "miss ratio." One of the techniques used to minimize the miss ratio is placement of the data and of terminals for a set of branches in adjacent geographical areas in the same machine.

The second application to be implemented is the authorization of credit. Assume that the same banking establishment requires a system with terminals in retail establishments to perform the credit authorization for its bank credit card. This application has little homogeneity; therefore, assume that it is placed on a single-node system.

The third growth stage is electronic funds transfer. When customers make purchases in a store using the second application system, the charges are reflected against the customer's balance in the first application system. This new application obviously will place a significant additional load on the combined system.

Probably the most attractive solution to the problem of handling this additional load would be to add more nodes to the first application system and redistribute the terminals and data so each node would handle fewer branches than before. In this way, additional capacity would be made available to handle the new application. However, this has some disadvantages which we'll discuss next week.

Scherr is manager of distributed systems programming with IBM's Systems Comunication Division in Kingston, N.Y. This article was adapted with permission from Vol. 17, No. 4 of the Systems Journal.

Accounting, Personnel and Finance

Survey Predicts Areas for Data Entry Upgrades

By a CW Staff Writer

ELLICOTT CITY, Md. — The areas of business that will most likely receive upgrades in data entry equipment during the next four years are accounting, personnel and finance, a recent survey found.

Of 110 users responding to the survey, "Data Entry: Users Prepare for the 1980s" by Impact Marketing Services here, 26 cited budgeting, from a list of finance department applications, as an area that will require an upgrade.

The 110 respondents represent approximately 14% of those originally solicited, a return rate Impact Marketing Services called "very good" for a mail questionnaire of an industrial-professional nature. Most of the responses were prepared either by the top DP official of the firm or by the data entry manager in firms that identified data entry as a separate managerial position.

More than two-thirds of those responding indicated that key-to-disk technology gave their organizations the best potential for solving their problems. Distributed terminals followed closely behind key-to-disk equipment as useful for data capture.

At the bottom of the list were magnetic ink character recognition equipment, voice recognition devices, point-of-sale terminals and Touch-Tone telephones.

Bells and whistles on data entry equipment appear to be secondary in importance to equipment reliability and postinstallation support for users. Given a list of 30 "weak links" — possible points of contention between users and vendors — more than 34% of those responding cited "technical support."

Software support closely followed, with 28% citing weak software support as a problem.

"Insufficient local site coverage by vendor" led the list of irritants, with 16 users mentioning this area.

"Reliability" of equipment led a list of six decision-making criteria respondents cited as influencing purchase decisions.

The amount of data collected at its source can be expected to double between now and 1983, the report predicted.

Copies of the report are available for $450 from Impact Marketing Services at 10318 Globe Court, Ellicott City, Md. 21043.

Throughput Up 18% for Bank

(Continued from Page 45)

of this is the use of a "reason code," instead of real data, in some fields.

If the operator has a problem with any data — for example, if it is illegible — the reason code is used. This also means the employee is not penalized for matters beyond his control, Aglialora explained.

Despite the claimed success of the program, several attendees seemed somewhat puzzled by this approach. Reduced decision making "is what a lot of workers have been complaining about," one attendee said after the session, citing recent work experiments here and abroad aimed at giving more workers discretionary powers.

The data enterers are not the only ones whose performance is rated numerically, Aglialoro said in response to a question. He, too, is rated on whether he reaches certain performance measures negotiated yearly, with his manager observed.

Other attendees were puzzled at Aglialoro's choice of records rather than the more traditional keystrokes as the unit of measure for the incentive program.

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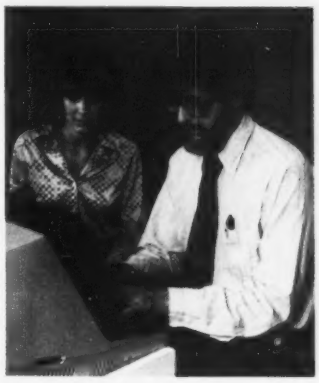

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Data Entry Seen Going Interactive in Five Years

By Howard A. Karten
CW Staff

NEW ORLEANS — Within the next five years, most data entry systems will be interactive. This development will contribute to lowering the cost of data entry and will provide greater security in running DP shops.

This was the prediction made by Michael Aldrich, a board director of Redifon Computers Ltd. — the UK's second-largest computer manufacturer — in a speech given here at the recent third annual meeting of the Data Entry Management Association (DEMA). Redifon makes data entry equipment.

"For 70 years, data entry has been done by cutting holes into pieces of cardboard . . . Try explaining that to your grandchildren," Aldrich suggested to an amused audience.

Historically, there have been two reasons for locating the keypunch/key-verification operation next to the computer room, he said. Not only was the medium bulky, giving users transportation problems, but it was also full of errors, which meant proximity to the computer room was necessary to make a correction.

CW At Dema

However, by the end of the 1980s, 80% of all data entry will be performed in locations other than the vicinity of the computer room, he predicted.

Two of the forces that will have triggered this trend are the "pendulum problem" — in which management swings from the desire for centralized operations to decentralized ones and back again — and corporate concerns over security. In the UK, Aldrich noted the security problem was sometimes referred to as "unpremeditated suicide."

Three Considerations

According to Aldrich, three considerations dominated computing in the 1960s: the scarcity of trained personnel, the lack of local computing power, and the need to justify the economics of computers by loading them up with heavy work loads.

But the 1970s are changing all that, helped in part by distributed data entry systems. "DP will no longer have total control of computer usage," Aldrich forecast.

Key Development

The key development for data entry systems has been the convergence of two technologies, key-driven, shared processors and remote batch terminals, Aldrich said. "Today, you get one hardware/software product that does the job that two previous products did. This system solves the problems of proximity and transportation."

Further, these systems have evolved to the point where pre-edit runs are no longer necessary. In fact, it is often better to do this phase of data entry on data entry systems rather than on mainframes, he noted.

Corporate Vulnerability

Calling corporate vulnerability in centralized systems "not limited to physical security," Aldrich observed that "the growth of a formal labor organization in large computer sites provides a very useful 'corporate jugular vein' in times of troublesome labor relations." For example, the strike involving 750 computer workers in the British Post Office (BPO) [CW, Sept 17] has resulted in a situation in which the BPO is now owed $2.5 billion because it has not sent out any bills for five months.

"No normal commercial organization could exist in that environment," he noted. However, problems such as these can be solved through decentralized data entry (DDE) systems.

Although DDE offers hope for users, it is not a panacea. "If the number of operators in an installation cannot be reduced and the amount of data cannot be reduced, productivity will be reduced by puttting in 'smart' DDE systems," Aldrich stated.

The rapid growth predicted for the multifunction terminal market will also raise some interesting sociological questions, Aldrich noted. For example, if a typist and a data entry operator are doing essentially the same work — key-entering information — should they be paid the same? Aldrich did not suggest a solution to this question.

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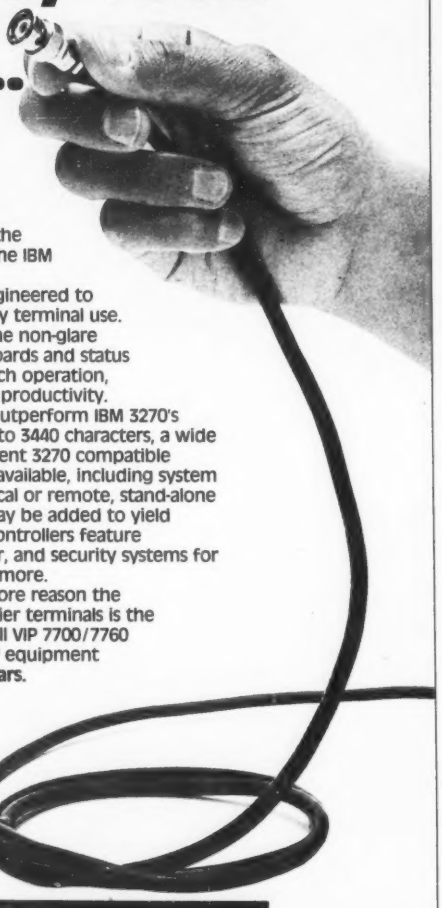

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Customer Service Personalized

CPUs Give Speedy Route to Paper Delivery

By Howard A. Karten
CW Staff

ATLANTA — Hand delivery of newspapers, one of the most labor-intensive areas of newspaper work, is rapidly catching up with computers, one of the least labor-intensive areas, at two daily newspapers here.

The papers, *The Atlanta Constitution* and *The Atlanta Journal*, are using computers to help deal with customer complaints, better manage the delivery routes and provide the papers' pressroom with a more accurate estimate of the number of copies that must be printed.

"Before we had the computer, we had a manual system" for the paperwork involved, according to Jim Bustraan, circulation director for the two dailies. "We'd get [four-part subscription orders] that would have to be split apart and sent four ways.

"Some of the data went directly to newspaper carriers. There was no base file to operate with, so subscribers would call in every day to complain or start their papers, and we wouldn't necessarily know they'd called before," he said recently.

Now, the papers are using two processors, a 4M-byte IBM 3031 and a 2M-byte 370/155, to answer customer complaints and deliver more than two million papers each week, Bustraan said. The circulation department has been able to handle an increased volume of customer complaints more effectively — and with a smaller staff.

Personalized Service

The systems are also helping the circulation department maintain contact with its 1,600 carriers, as well as with subscribers, 700,000 of whom called last year to inquire or complain about deliveries.

"Our whole philosophy is to be sure we can service our subscribers — [by knowing] who they are, where they are — and to be able to handle calls intelligently when they come in. We've been able to get customers a more personalized service through the use of a computer," Bustraan said.

"Customers like our system. Let's face it, when you call up and you can intelligently talk to people, they like that. People are a little frustrated today that no one knows them," he noted.

The papers use a variety of hardware to help them give this more personalized service to subscribers. These include the two processors, which run under OS/VS1 (and are not linked with each other); three Documentation, Inc. 2250 printers; six Storage Technology Corp. 3420-equivalent tape drives; and 24 Memorex Corp. 6750 (IBM 3350-type) disk drives. The terminals on the system are IBM 3278-4s.

"We try to mix and match," according to George Coon, director of computer services. "We try to find the best deal for the dollar."

Although there were originally some problems because of the mix of vendors, Coon said, these disappeared after one or two brief meetings in which the papers explained to the vendors what they wanted. "Straightening out problems has never taken more than just a phone call," he reported.

When a subscriber calls to complain or to start a subscription, the relevant data — such as name and address, telephone number, Zip Code and census tract number — is entered into the system. Complaints , in particular, are highlighted on the screen until they have been resolved.

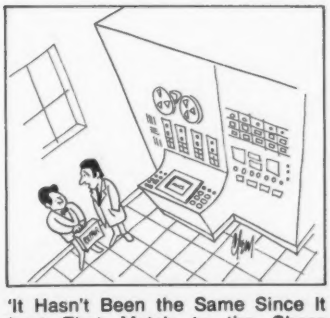
This data is handled by the computer on an exception basis. That is, all data is processed and stored, but only data that is needed for later use is printed out.

Included in this category are changes for a particular paper route, such as an order to start or stop delivery. Information that will affect the number of papers to be printed is also compiled for the benefit of the pressroom and the distributors.

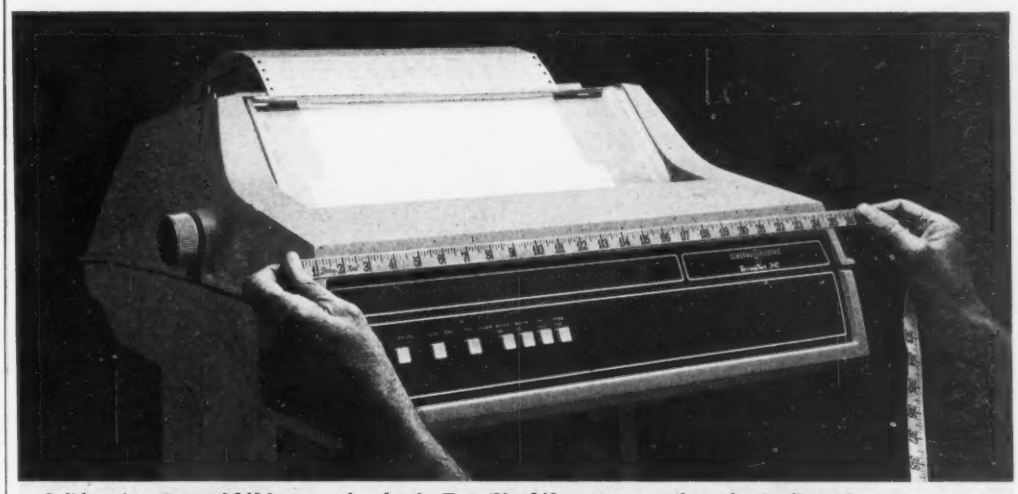
"In the long haul, this helps to manage distributors better. You're coming from a very traditional system with little control to a system that really gets a little scary when you realize [how much information] you've got on your hands," Bustraan commented.

When the system was first installed, he noted, some users and distributors resisted and complained. But this has stopped, and the system is now favorably regarded.

The paper's future computerization plans call for possibly replacing the 155 with a 3032-class machine next year. "We're talking with Itel Corp. and Amdahl Corp. and waiting for IBM to make its move," Coon said.



'It Hasn't Been the Same Since It Lost That Match to the Chess Player.'



Solid engineering and 340 lpm speed make the TermiNet 340 a more rugged, productive line printer.

Don't let the compact size of the General Electric TermiNet 340 line printer fool you. Because no matter how hard you work it, it won't quit on you. It's that tough, that dependable and that much better than typical line printers. And it's available now.

A true 100% duty cycle printer

Unlike ordinary line printers, the TermiNet 340 can take the punishment of the broadest range of operating environments—from front office to factory floor—without complaining. The key reason? A tough, ruggedly engineered design. As a result, it keeps on performing under tough-use conditions when other line printers would sputter and break down.

Engineered to stay on the job.

From top to bottom, the compact TermiNet 340 line printer is engineered with long-life components designed to keep the printer on-line. And businesses on schedule.

One reason: extra-thick, heavy-duty, environment-resistant materials chosen for the base and housing. Together, they provide this rugged printer with the impact strength, dimensional stability and resistance to adverse environments needed to keep working.

More reasons: print and ribbon systems that won't wear out prematurely and won't cause the problems other line printers do. Which is why the proven rotating-belt print system will last billions of characters. And why the ribbon cartridge will maintain very high print quality for at least 100 million characters.

Fewer service problems keep it working longer

The fact is, TermiNet 340 line printers are such productive workers, they require very little attention and very little maintenance once they're up and running. Should service be needed, you can count on getting these printers back on-line in a hurry. That's because of convenient self-test features that make troubleshooting easy and fast. And because of a responsive nationwide service network that keeps downtime to a minimum and operating costs low.

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Any way you measure them, TermiNet® 340 line printers are more productive performers

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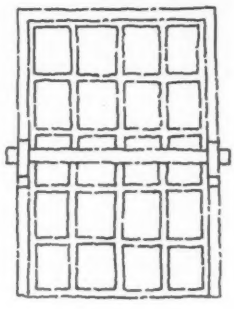

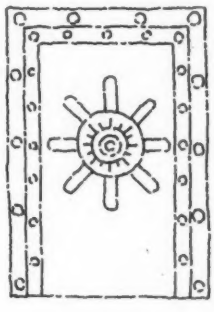

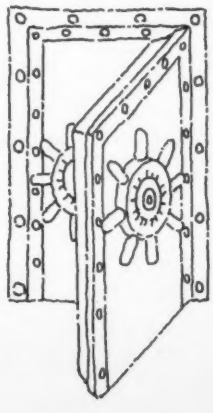

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The Secret And Promise of Fiber Optics

By John Gantz

While the theory and technology behind fiber optic transmission delve into the mysteries of quantum mechanics, particle theory, sophisticated materials processing and the nature of electromagnetic spectrum, the concept behind it is simple.

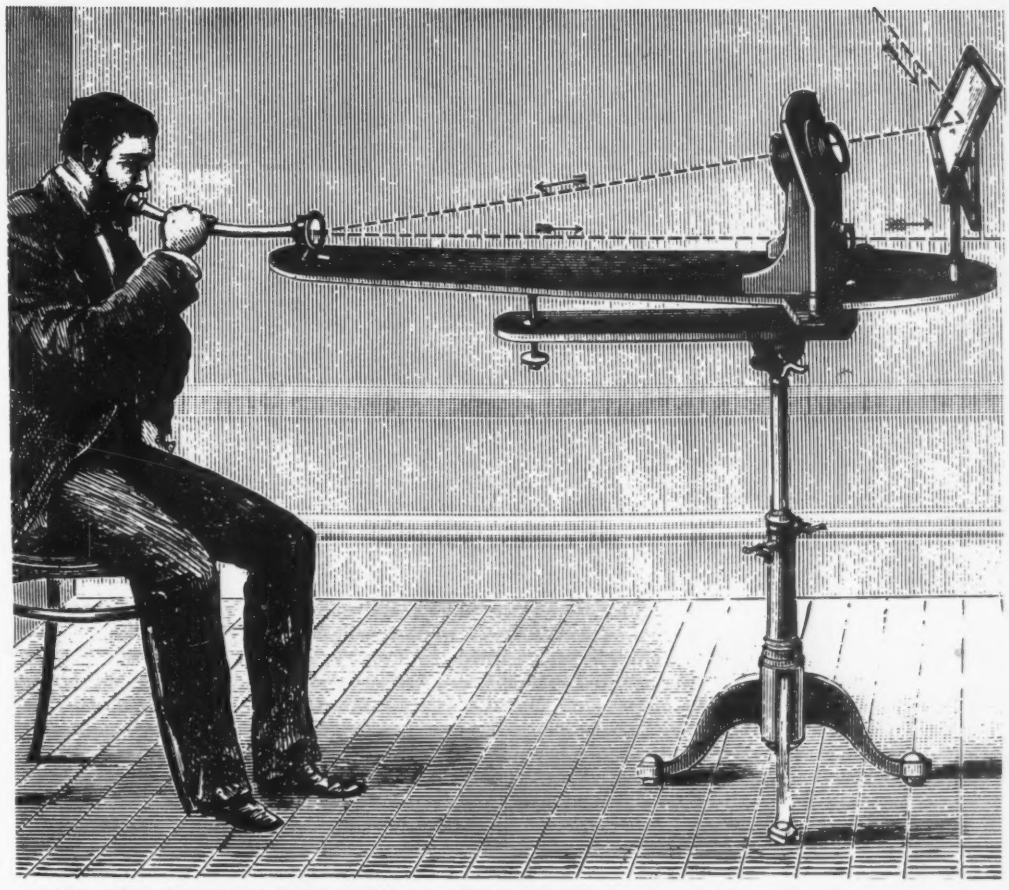
It's all "done with mirrors" — or at least the reflection and refraction (bouncing and bending) of light waves, in this case inside strands of glass thinner than a hair and stronger than steel. Communication occurs by coding information into pulses (the presence or absence of light) and sending it down the strand to be decoded at the other end.

The coding of light signals for information transfer is not new. From one-if-by-land-two-if-by-sea signal lanterns to Claude Chappe's optical telegraph system that employed semaphore stations placed on hilltops in France in the 1790s (and which allegedly could send a message 200 kilometers in 15 minutes), coding techniques have been around. The Bell "Photophone" was invented in 1880.

These older systems suffered two flaws which stymied realistic development and usage:

- Light signals lose power rapidly as they travel through the atmosphere.
- Methods of generating signals were primitive.

As a result, the cobwebs of history collected on light wave communications while Morse, Bell and Marconi reshaped the communications landscape (literally) with the telegraph, telephone and radio. These used electrical signals for information coding and either wires or low-frequency electromagnetic waves for carriage.



In Bell's "Photophone," sunlight bounced from a reflector through a lens to a mechanism that vibrated in response to speech. This caused the light beam to vary in intensity. At the receiving end, a selenium detector translated these variations into electrical current to recreate speech through a telephone receiver.

Light waves lost prominence to radio and electrical transmission only within the last 100 years. Now, through the technology of lasers and glass fibers, light waves may again predominate. And a new industry is in the offing.

Enter the Laser

Then Bell Labs invented the laser.

Because lasers are small, emit single-color infrared light and use little energy, engineers began to tinker with them as signal sources in light wave communications systems. If workable systems could be developed, lasers would allow vastly greater amounts of coded information per unit of spectrum than conventional systems.

Since the 1960s, lasers have grown from cumbersome and unreliable devices with short life spans to small, readily available light sources with life spans of several years.

In addition, simpler and cheaper devices known as light-emitting diodes (LEDs) — most familiar to us in the displays of hand-held calculators — emerged as possible light sources.

At the same time, advances in semiconductor technology, spurred by the growth of computers and electronic weaponry, yielded new and sophisticated devices for detecting tiny light signals. These detectors, called photodiodes, made it possible to translate light signals back into the coded information. All that was needed, then, was a system for transmitting the light signals.

Corning's Glass Fibers

In 1966, events conspired to kick off efforts to design such a transmission medium.

The theoretical capabilities of glass fibers to prevent loss of light signals were determined to be quite high (per a paper by K.C. Kao of ITT in Britain), and the British Post Office and Bell Telephone Labs asked the world's foremost glass maker, Corning, to develop fiber optic cables that would *only* lose 99% of any light signal over 1,000 meters. (At that time, fiber optic materials were less clear than water and would lose 90% of any input light within 20 meters. Mother Nature's laws decree that to increase that capacity the 50 times needed, the impurity levels in glass would have to be decreased below two parts per billion.)

Corning put some scientists on the problem and by 1970 — using a totally new method of making glass — had reached the 1% in 1,000 meter level of purity. By now, factory-built cables can routinely deliver 50% of a light signal over 1,000 meters. If water were that clear, the bottoms of all the oceans would be easily visible.

Costs have dropped, too. Corning now sells fibers made by salaried laboratory personnel at $1 a meter but is taking orders for production volumes

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IN DEPTH

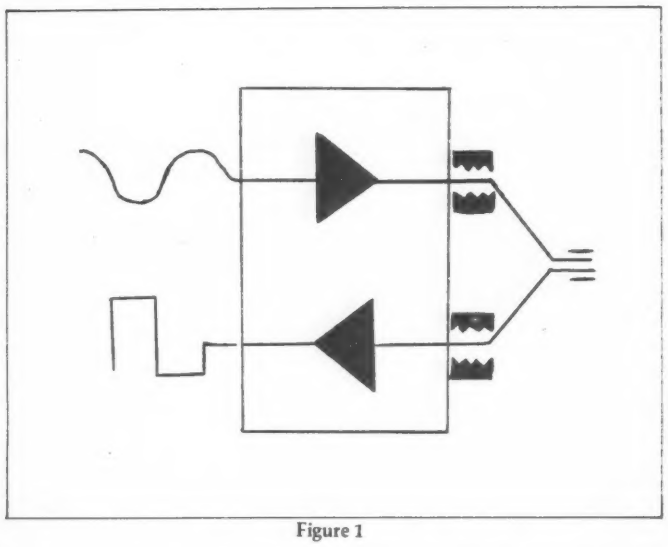

Figure 1

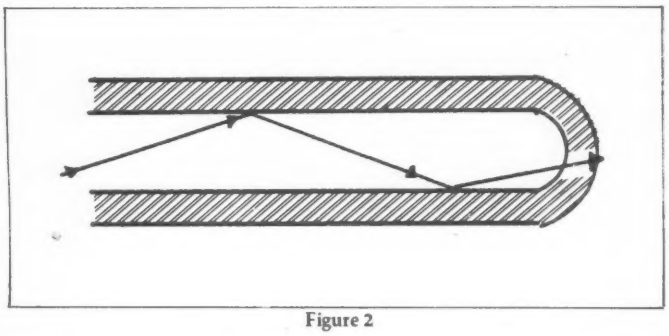

Figure 2

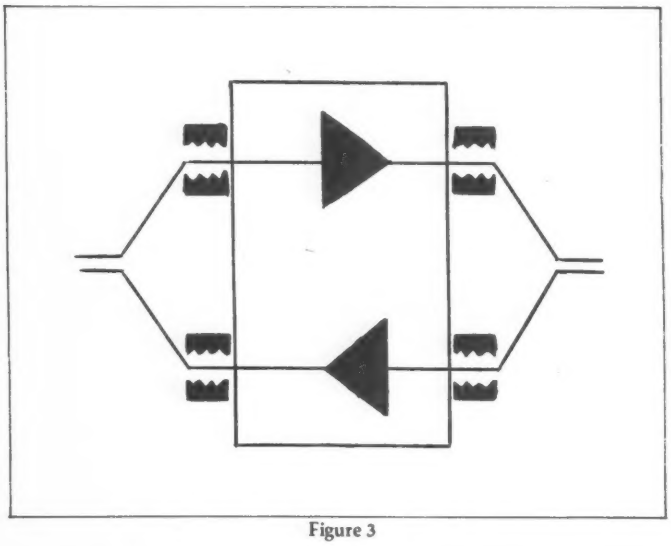

Figure 3

(Continued from In Depth/1)

at 10¢ a meter. Fibers now competitive with coaxial cable, Corning says, will eventually cost the pennies per meter of copper wire. (Cables, which include protective coatings and strengthening members around the light wave fibers, generally cost about three times as much.)

Thus Comes Communications

With lasers, photodiodes and high-purity fibers, the makings of communications systems became possible. The basic components include:

• **Transmitting/receiving devices.** These are the lasers, LEDs and photodiodes that translate electrical energy into light energy and back again (See Figure 1). The actual lasers and photodiodes can be very small (the size of a grain of salt); associated I/O equipment will make these units bigger.

The choice of types of component depends on the transmission quality needed. Lasers, for instance, are a higher quality light source than light-emitting diodes but are less reliable than LEDs. Of the two types of photodiode — PIN and avalanche photodiodes — the PIN detectors are simpler but less sensitive than the avalanche devices, which cost more and are more susceptible to temperature and reliability problems.

• **Optical fiber waveguides and cable.** These form the transmission path (See Figure 2). Very short distances can be traversed with plastic waveguides, but most fibers used for communications are made of glass. Waveguides vary in cost, purity and light-carrying capability.

Fibers are classified as to whether they are *graded* index or *step* index fibers. They can also be classified as single-mode or multimode, depending on their ability to transport off-axis light waves.

Cables can be classified as single-fiber or bundled-fiber. The former are convenient for transmitting single channels, but are harder to splice and connect.

• **Repeaters.** Repeaters regenerate signals that have worn out (See Figure 3). They are simply transmitter/-receivers placed in the transmission path. Where once repeaters were required every kilometer, now they are typically spaced 10 to 15 kilometers apart. This is better spacing than in the land-based electrical telephone system.

• **Splices, couplers, connectors.** These (See Figure 4) are the unglamorous but absolutely essential ingredients in fashioning systems out of components. Oddly enough, some of the biggest hurdles the fiber optic industry will have to overcome are in the area of connections and splices.

Since the fibers themselves, nestled in the cables, are hair thin, alignment is one problem. Another is light loss. A third is installation, requiring special tools and training for workers.

Putting all these components together, a fiber optic system works by bending light waves through glass fibers embedded in cables (See Figure 5). For light sources, small lasers or LEDs are used; for detection, photodiodes. For installation purposes, connectors, splices and couplers are required, along with tools and training to use them.

Benefits of Fiber Optics

Communications systems using light wave communications have several advantages over electrical or radio systems:

• Higher capacity (bandwidth).

(Continued on In Depth/4)

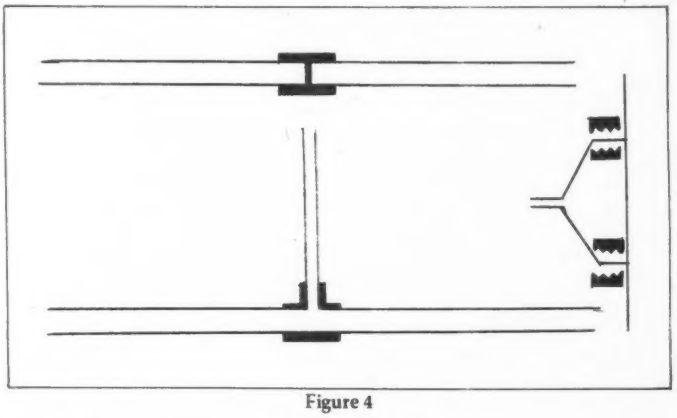

Figure 4

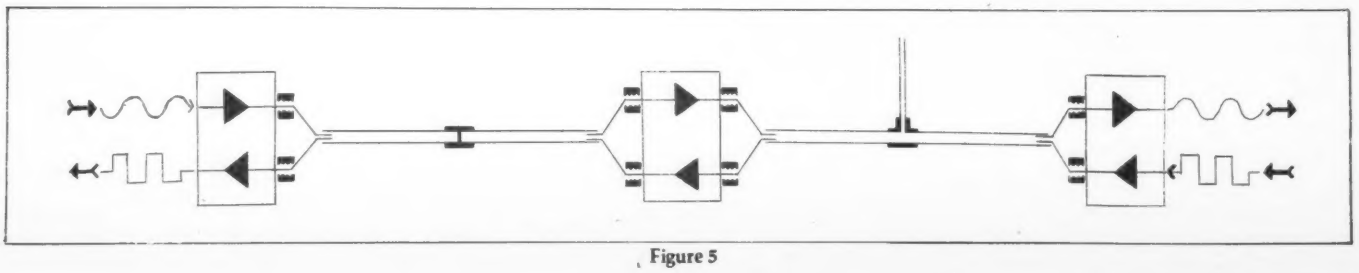

Figure 5

"NCR's VRX has cut our run time by 36 percent," says Yasuhiko Okiyama of Sumitomo Bank.

OKIYAMA:
Sumitomo's sudden growth — from $900 million to $1.3 billion in a single year — has caused us to upgrade our EDP system. We are moving from an NCR Century 300 to two NCR V-8580's. And moving smoothly despite the pressure of increasing volume.

NCR's BOB SULLIVAN:
VRX (NCR's Virtual Resource Executive) is making a substantial contribution to increased productivity.

OKIYAMA:
We are using VRX to run our batch operations. VRX has cut our run time for these programs by 36 percent.

Yasuhiko Okiyama (left) is Vice President and Manager, Sumitomo Bank of California, San Francisco, the 92nd largest bank in the U.S. Bob Sullivan is an NCR district manager.

SULLIVAN:
Your online experience has been impressive, too.

OKIYAMA:
We have seen a 15.4 percent improvement in the handling of online transactions due entirely to the new generation hardware. And we know there will be another impressive jump in efficiency when VRX takes over the online operations. Under VRX, error recovery takes just seconds. With the old system, we needed a full minute.

SULLIVAN:
VRX offers full dynamic resource allocation and virtual memory with no rigid memory partitioning. You can run up to 35 jobs simultaneously. And Sumitomo will soon be using Online Program Development (OLPD), a feature of VRX that multiplies the effectiveness of a programming group.

OKIYAMA:
Still, the most significant point I can make about this move from the last generation of NCR equipment to the next is that our old programs continue to run. We are making the transition easily because none of our software has become obsolete as a result of the change in hardware.

SULLIVAN:
That's NCR's Migration Path Engineering. One of our primary objectives is to provide easy alternatives for our users as the demands on their systems change. To eliminate dead ends. So that every user can upgrade gradually as his volume grows.

In the NCR office near you, there is an NCR account manager like Bob Sullivan who knows your industry and knows NCR systems, including VRX. To learn more about what an NCR system can do for you, phone him at your local NCR office. Or write to EDP Systems, NCR Corporation, Dayton, Ohio 45401.

NCR
Complete Computer Systems

IN DEPTH

(Continued from In Depth/2)

- Immunity from electrical interference or "noise" from other communications links.
- Immunity from outside disturbances, such as electrical storms.
- No need for ground wires or loops.
- Immunity from wiretapping.
- Benignity to digital communications.

Naturally, all these benefits work together to provide the trade-offs in system design and the impetus for development. Detracting from the promise of fiber optics are the facts that 1) the industry is still in the development stage, with costs to match; 2) entrenched systems (and serving industries) are electrical or radio; 3) system standards have yet to evolve; and 4) installation requires new tools and training.

But glass is cheaper than copper — it's made of the same ingredient as sand — and fiber optic systems are being installed at rates higher than observers of even a few years ago expected.

Higher Capacity, Smaller Size

If the theoretical limits to fiber optic transmission capacity are astounding, the practical limits are almost as much so. In the Bell System's test installation in Chicago, each half-inch cable (with 24 fibers in it) could carry more than 8,000 simultaneous phone conversations.

One single-fiber cable has carried more than 30,000 telephone messages over a distance of six miles in a demonstration. And Bell recently announced an experimental fiber optic system that operates at 500M bit/sec. Researchers think 1,000M bit/sec is possible. This far surpasses the capacity of either coaxial cable or twisted copper wires. (The phone system, for instance, operates in the kilobit-per-second range; most data transmission is at the 2,400 bit/sec range.)

Other advantages accrue as a result of these capacities:

- Communications system capacities can be increased greatly without requiring new cable ducts, since the small fiber optic cables can be readily snaked into existing (even crowded) ducts.
- Though the fibers have the tensile strength of steel or more, they offer weight savings of 80 to 1 over existing coaxial cables. This aids in cutting installation, shipping and storage costs.
- Fiber optics makes wide-band data paths more feasible, including TV communications, computer-computer transmissions and more. Already fiber optics is used experimentally by cable TV operators, and at least one run-of-the-mill computer user has workstations hooked to a processor by fiber optic cables.

Importance of Being Nonelectric

Because fiber optics sends messages on "photons," and not electrons, the method is immune to most of the problems associated with electrical and radio systems operating in an environment filled with radio waves and electrical disturbances. It also doesn't require links "to ground" to work.

Since much of the cost in devising communications networks arises from attempts to minimize crosstalk and interference, fiber optics offers tradeoffs beyond simple cable costs.

(One problem with fiber optic systems for telecommunications would be in signaling — making the phone ring. That takes power. But recently Bell Lab scientists announced that they had devised a method to ring the subscriber phones using the same fiber that carries the voice traffic. The trick is to use a very efficient light detector and convert one of the light wave frequencies to electrical power, much as solar cells do.)

Security Pluses

Another advantage of fiber optics, especially in military or data-related applications, is its security, which stems from two sources:

- Most light wave communications will be digital, which is much harder to decode than analog transmissions and which is easier to encrypt.
- Apparatus for intercepting light waves for eavesdropping purposes doesn't yet exist. Developers have a hard enough time splicing cables and making connections as it is. Doing so under hostile conditions (and not affecting the signal) would be doubly hard.

As a result, one of the biggest early

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markets for fiber optic systems will be the military, for both voice and data transmissions.

Beauty of Digital

Like any form of electromagnetic communications, light-wave systems can operate either as analog or digital. In the simplest system, say a voice phone system, the amplitude (loudness) of the input signal (after sound has been converted to electricity) is translated directly into amplitude variations of the light beam. These are then sent down the light guide.

At the receiving end, the photodetector converts the varying intensity of light into an electrical signal. This, in turn, is amplified back into the original signal and changed to sound in the phone handset.

But there are problems with analog transmisssion:

- Signals decrease with distances and degrade because of system "noise." At repeater stations, which reamplify the signal, such noise is amplified as well.
- Analog systems are not as amenable to computer transmissions, which must be converted to signals in analog wave forms. This, and the analog transmission itself, leads to errors.
- Speeds for computer-type devices communicating over analog systems are slower than native speeds.

But with the advent of computers, which would like to talk in digital parlance, and semiconductors, which make sophisticated electronic devices cheaper by the month, digital systems have begun to make more and more economic sense.

In addition, scientists have refined their techniques for coding analog waves into digital pulses. Not so many are required to reproduce (normally analog) voice signals.

Digital systems in themselves have advantages. First, they not only permit computers to talk with ease, but the use of computerized digital *switching*, just now coming into vogue, is easier with digital transmission paths. The giant Electronic Switching System (ESS) No. 4 that AT&T advertises is such a digital switch.

Digital systems also produce fewer errors. This is because when the signal degrades and needs to be amplified, it can be easily repeated as a newly generated pulse. Noise and distortion are not repeated along with the signal. And digital systems are amenable to time division multiplexing.

Fiber optic systems, thanks to the lasers and LEDs that serve as light sources, are especially amenable to digital transmission. (They always have been, as a matter of fact: flashing light and Morse code could be considered a digital system, since information is coded in pulses.)

Fiber Optics in Use

Let's look at some specific examples. One of the most well-publicized fiber optics installations is AT&T's mile-and-a-half installation under the streets and manholes of Chicago. The test installation, initiated more than two years ago, followed an earlier experiment in Atlanta.

In the Chicago test, cables made of 24 fibers — each pair capable of transmitting at 44.7M bit/sec or carrying 672 simultaneous phone calls — transports voice, data and video between two Illinois Bell offices and also connect to a downtown office building. The video in the experiment comes from picturephones in the Bell offices.

The light sources in the test are gallium arsenide lasers, with LEDs also tested; the detectors are avalanche semiconductor photodiodes. Because the cable stretches only a third of the distance the signals could travel unaided, there are no repeaters.

Some specific findings of the Chicago test:

- Downtime was virtually nonexistent, with a projected annual outage of 30 seconds a year. "Not a single phone call has been interrupted or affected as a result of light wave communications," according to a company spokesman.
- Both lasers and LEDs are used as light sources, proving that the latter, less powerful devices are adequate.
- A mass splicing technique, first tried in the Atlanta experiment, worked with better-than-expected results.

It was the success of Bell's Atlanta experiment that led to the Chicago trial. The Chicago trial, in turn, led to Bell's announcement last fall that Bell

(Continued on In Depth/6)

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IN DEPTH

(Continued from In Depth/5)

Labs would make available to Bell operating telephone companies a "standard metropolitan trunking system" using fiber optics. The first system will be installed back in Atlanta in the fall of 1980.

In another instance, Harris Corp. has been awarded a $6.6 million contract by Alberta Government Telephones to design, build and install a high-capacity fiber-optic telephone system that will use 32 miles (50 km) of cable. The Alberta system will transmit at 275M bit/sec, or six times the rate used by Bell in Chicago. That will permit 4,032 conversations on each of the 12 fibers to be installed.

(In telecommunications parlance: the Bell Chicago test operates at "T-3" rate, sometimes referred to as "DS-3" when talking about switches. The Alberta rate is "T-4.")

In the system, which will run between Calgary and Cheadle, Harris has cited several breakthroughs:

- A microprocessor is used as a system controller, actively monitoring the system and running fault isolation.
- Computer simulation was used in deciding on the trade-offs between cable performance and repeater spacing.
- Field trials proved that fiber optic cable can be used with conventional plowing techniques.
- Harris says the fiber optic cable has a lifespan twice that of conventional cable's 12 to 25 years.
- A light source has been demonstrated with 100,000 hours mean time between failures.

Harris claims some other fiber optics firsts, including the making of a multiple-channel concentrator for computer-computer and computer-peripheral interconnections. At present, fiber optic cables cost more than copper cables (See Figure 6). At the link level, the simplest electrical systems cost 10 cents to 20 cents per meter, but performance is typically not very good and bit error rates high.

Today's optical systems cost more but can do jobs copper cable cannot. Relatively simple optical systems transmit hundreds of megabits per second with bit error rates exceedingly small.

The earliest systems cost more than several dollars per meter. Since then the cost of high-performance systems has come down to less than $2. Low-performance systems are even less. Two factors will conspire to bring those costs down still further:

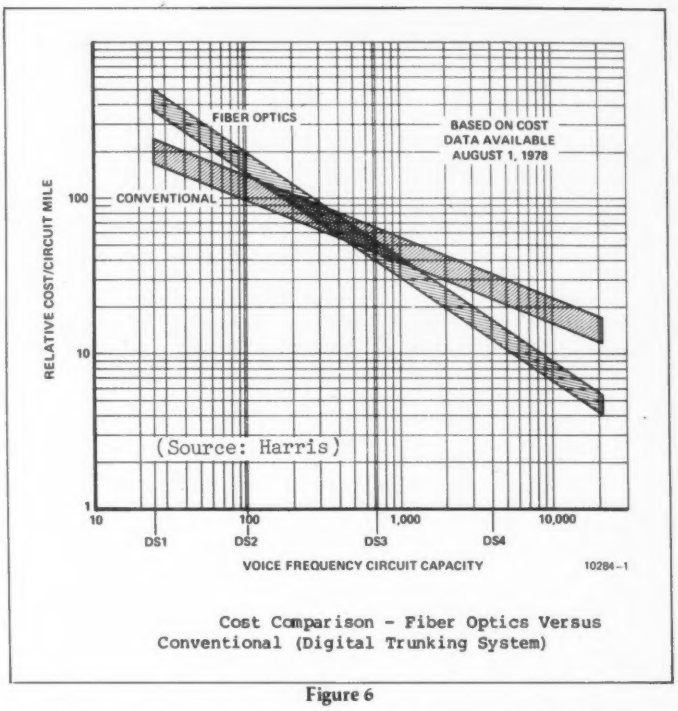
- The purity of optical fibers will be increased (which is more effective than making more powerful light sources) and the fiber characteristics will be matched to the light source's characteristics.
- Larger production runs will bring manufacturing economies.

In fact, this year has seen enough price cutting among cable and lightguide suppliers to suggest a price war is almost under way.

Markets, Suppliers

By computer industry standards, today's market for fiber optic cable, components and systems is infinitesimal. Last year, the most optimistic forecasts put the shipments at $70 million (a more realistic estimate is $30 million). Virtually the only real market today is in experimentation.

But this will change. By 1980, the fiber optic industry will have passed the $100 million mark. Five years later, it could well be a $1 billion industry (inflation discounted), but projections beyond two or three years are risky.



Cost Comparison - Fiber Optics Versus Conventional (Digital Trunking System)

Figure 6

For comparison, remember the minicomputer industry. Not until 1966 did shipments of minis pass $100 million; not until 1975, nine years later, did they pass $1 billion. But by 1983, shipments will be $10 billion. In addition, supplier revenues are bigger than shipments by anywhere from 10% to 30% because of add-ons and service.

Scoff not at fiber optics. Most observers see tremendous potential. Most see the industry taking off faster than anyone anticipated, in part because of continuing successes in increasing fiber clarity and laser lifetimes. Workable systems have been installed without complications and are working still. The markets are fledgling, but flying.

Varied Uses

As with all high-technology aborning markets, the government, especially the military, seems to be the first attractive market. Indeed, between 1975 and 1978 more than half of the fiber optic systems installed in the U.S. went to the military or government. These include installations at the Naval Ocean Systems Command, the National Aeronautics and Space Administration, Rome Air Development Center and Wright-Patterson Air Force Base.

If that's the first fiber market, though, it's not destined to be the biggest. Instead, fiber optics will find its most fallow long-term market in the telephone industry (See Figure 7) as the wide-bandwidth cables take their unobtrusive places in crowded urban ducts. Cables can also be strung from poles, since the fibers are less affected by temperature and humidity than copper wires. This year, in fact, Commonwealth Telephone of Dallas, Pa., will string a 13-mile link between Mansfield and Wellsboro, Pa.

There are other markets of substance, too:

- **Computer peripheral I/O connections.** Bulky cables with bandpasses typically of 1M- to 3M byte/sec and comprising perhaps 40 coaxes can be replaced by one or two fiber optic connections. Translating the parallel coax signals into serial optical ones will re-

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quire buffers (which semiconductor advances are making possible), but savings will come in installation and site preparation.

The biggest problem in computer applications is changing interface standards and promoting new ones in the face of years of development gone by. Until 1984, the computer industry will be a bigger market than the telephone market.

• **Cable TV applications.** This market seems a natural for fiber optics. One of the technology's greatest proponents, Irving Kahn, president of BroadBand Communications, Inc. (formerly of TelePrompter, Inc.), calls the technology "the master key which will at last open the gateway to broadband communications and create a mode of communications which completely changes the characteristics of a cable television plant."

The biggest problem with fiber optic application to CATV is currently in the local distribution, where traditionally one cable provides the service and each subscriber taps it. With fiber optic cables, at least at present, it's not possible to multiplex that many channels together and get good performance. And "T" and "star" couplers are not yet of good enough quality to be practical in a local CATV distribution system.

• **Industrial applications.** Fiber optic cables will find application in industry, especially where fiber's nonelectrical properties are salient. Examples include cabling in nuclear power plants, machine tool interconnects, security systems, oil refineries and gas pump monitoring.

Kessler Marketing Intelligence, for instance, predicts that by 1983, 200,000 gas pumps in the U.S. will have fiber optic interfaces, since fiber optic links offer no safety hazards from sparks.

• **Automotive electronics.** The market here includes alcohol ignition interlocks, automatic cruise control, instrumentation, exhaust regulators and more. General Motors is currently the largest auto-making user of fiber optics (mostly very high-loss cables), using about $2 million worth of fiber cable a year.

Crowded Vendor Line-Up

More than 50 vendors currently play a part in the fiber optics market. Most cover only one or two of the following submarkets:

- Fiber.
- Cables.
- Electronics (laser, LEDs, photodiodes, receivers/transmitters, repeaters, connector electronics).
- Connectors, couplers, tools.
- Systems.

While there are a lot of suppliers, probably only a few will become major forces in the industry. And some, like IBM and to some extent AT&T, may not be "suppliers" at all yet "market" significant numbers of systems to captive markets in their own organizations.

The present leaders in the industry are Corning, AT&T, ITT, IBM, RCA, Spectronics, Inc., Valtec Corp., Harris Corp., Times Fiber Communications, Inc. and Hewlett-Packard Co. in this country. The leaders in other countries include Fujitsu, Nippon Electric Co., Northern Telecom Systems Corp., Canstar Communications (Canada Wire and Cable Corp.) and Siemens AG. Many of these companies offer products in all the submarkets.

In *fibers*, Corning and ITT are the clear leaders, as much in their size as their products. Times Fiber, Calileo and Valtec are also major U.S. suppliers, though much smaller companies. These companies offer *cables* of various types, sizes and performance. Other major cable suppliers are Siecor (a Corning-Siemens joint company), General Cable and, outside the U.S., Thompson CSF, Cranstar and Plessey Ltd.

In *electronics*, the ball game belongs to Valtec in light sources through its subsidiary, Laser Diode Labs, and to RCA, Northern Telecom, and soon Texas Instruments, Inc. in detectors. ITT and HP are other big names and, of course, IBM and AT&T.

Recently, Exxon formed a new subsidiary to make and market semiconductor lasers. Others to watch, depending on how much they put into their opto-electronics divisions, are

(Continued on In Depth/8)

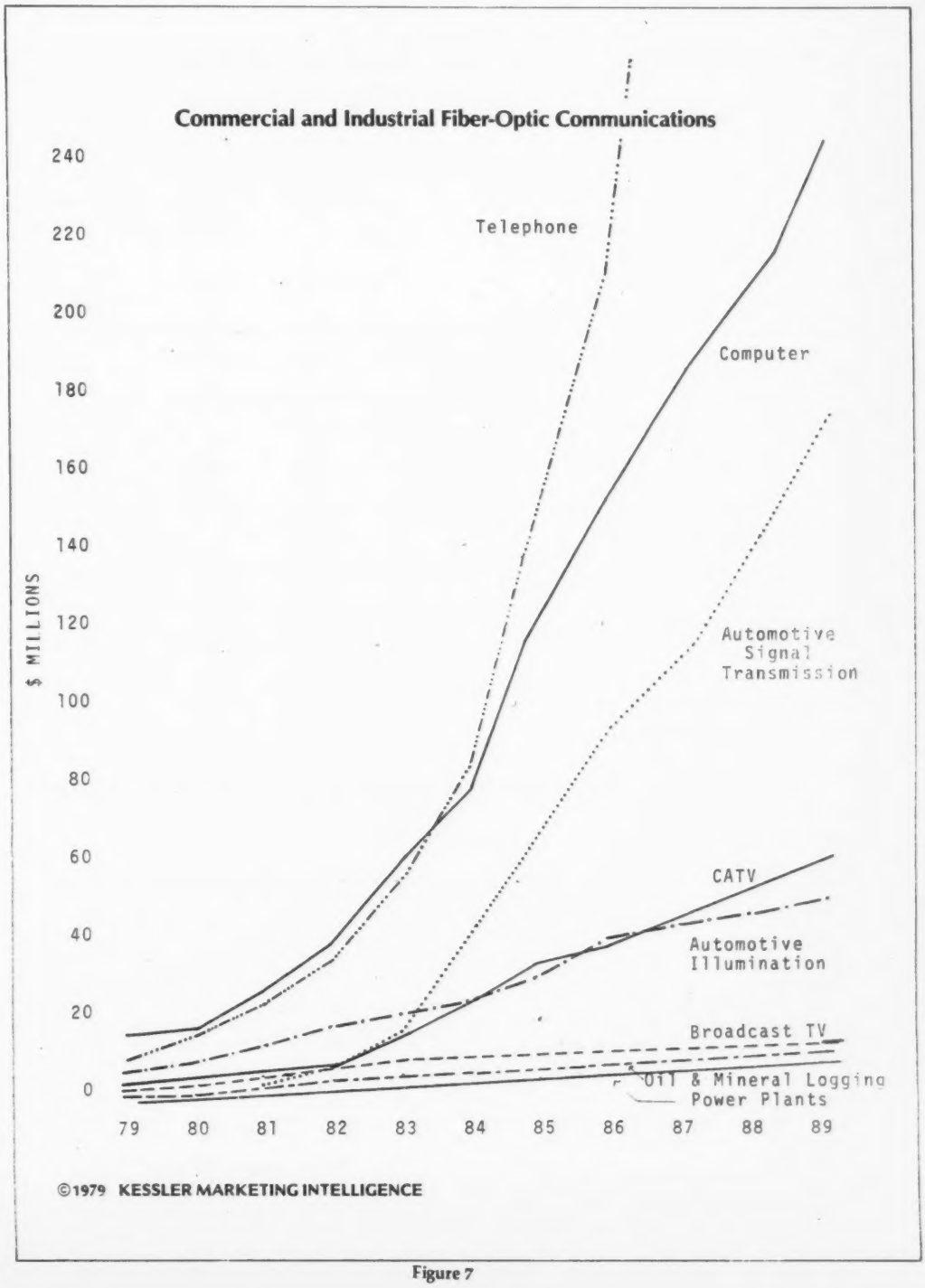


Figure 7

IN DEPTH

How the Fibers Actually Work

The fibers are composed of three layers. The outer layer is a protective plastic coating that guards against dirt and scratches.

The second layer, called **cladding,** bounces loose light waves back into the third layer, called the **core.** These two layers are made of glass, but different kinds (with different refractive indexes), to transmit and contain the light waves.

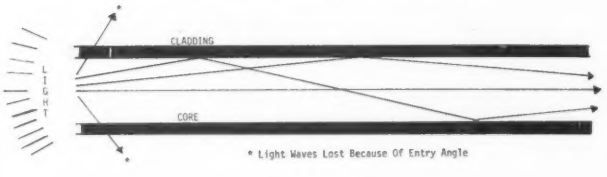
The transmission sequence:

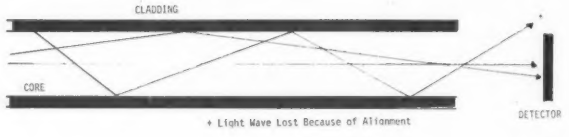
1. Light waves enter fiber. Those with extremely sharp angles pass out through the cladding.
2. The rest of the waves travel through the core, bouncing off the cladding on the way.
3. At the end, the light waves are detected by a photodiode. Some are lost to alignment.

It's not all peaches and cream. Some light rays reach the end of the fiber sooner than others, depending on how much or little they bounce around inside the core. This causes spreading of any signals sent on the waves and is called **modal dispersion.**

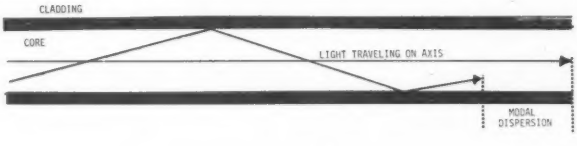
The solution to modal dispersion is to make the core in such a way that it has a different "index of refraction" at different distances from its center. Such a fiber is called a **graded index** fiber, and light rays that deviate from the fiber axis travel faster than rays that deviate less, thus they all arrive at the end at the same time.

Another type of dispersion occurs because the light passing through fiber is made up of light signals of different frequencies (colors). By its nature, the glass in the core permits light of different frequencies to travel at different speeds. This leads to what is known as **spectral dispersion.** The solution is to provide a light source of as few different frequencies as possible — or to slow down the input signals to a speed where the dispersion doesn't matter.

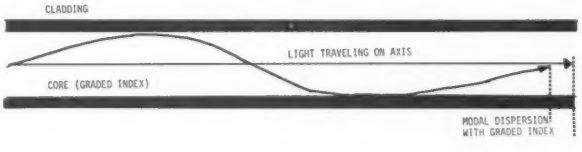




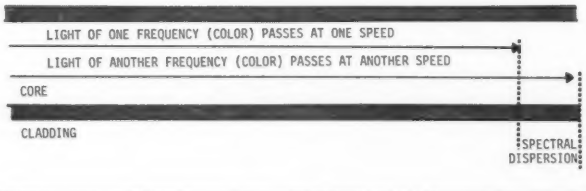
EXAMPLE OF DISPERSION IN NON-GRADED (STEP) INDEX FIBER



DISPERSION IS LESS IN A GRADED INDEX FIBER



AN EXAMPLE OF SPECTRAL DISPERSION



(Continued from In Depth/7)

Rockwell International and Motorola. And, of course, the Japanese.

In *connectors, couplers and tools,* probably the single best independent supplier is AMP, Inc., whose products were recently featured in RCA and ITT fiber optic links. Augat, Inc., Hughes Corp. and Bunker-Ramo Corp. are other important suppliers.

And there are *systems,* with a slew of suppliers. Here, most market applicants have realized the advantages of vertical integration, and those without the werewithal of an IBM, HP or ITT to go it alone have opted for acquisition, merger or other joint relationships.

Take Siecor. Corning had the fiber drawing capability, Siemens the electronics. Or Valtec, an early fiber maker, which acquired Laser Diode, a prime maker of light sources. Most systems suppliers, except for the powerhouses, are contributors in one or two submarkets, customers in others. Their systems combine their own and others' products.

Evolution of Market Forces

Innovation is the prime mover in young industries. High-technology upstarts, often shoestring outfits, find it possible to capture whole submarket shares. In older industries, financial marketing and service powers come into play as does the matter of captive markets.

The fiber otic market is in its infancy. For all the strengths of an ITT, RCA or HP, other corporate commitments by big companies provide opportunities for breakaway companies. As the industry ages and learning curve trials accumulate, shakeouts occur. This scenario will undoubtedly hold true in fiber optics.

(IBM provides an example of both stages of growth. Started as a spin-off from NCR Corp., it thrived in a punch-card niche NCR was too big to plumb to its depths. Stage one. Later, when computers hit the scene, IBM was bigger, with a tab equipment base. Thus the company had an edge over Univac, once the foremost maker of computers, when the industry left the cradle. Stage two.)

Some prime candidates to survive, besides the obvious IBM and AT&T:

ITT, an aggressive marketeer and manufacturer of fiber and a potent systems integrator with a sizable captive market.

Northern Telecom, especially aggressive in the electronics end, also with a captive market.

Siecor, probably destined to be the Macy's to ITT's Gimbels in the making of cable. Its well-endowed parentage could lead the company to become the major supplier at the cable level.

Valtec, an early leader in seeking new applications, most recently with a digital integrated TV, data, audio link for CATV and CTV (Closed Circuit Television). A likely candidate for acquisition by, say, General Telephone and Electronics (GTE).

HP, actively pushing customer education and with a stake in optoelectronics. It could lead in external data links for computer applications.

Harris, sophisticated in high-technology communications systems, with experience in all forms of broadband communications (satellites, high-speed data, video) that should stand it in good stead.

Other major subsystem suppliers: TI, RCA, Spectronics, Rockwell, Exxon and Bell & Howell. Major integrators: TRW, Inc., Sperry, Raytheon, GTE.

Many other suppliers will thrive in the early days of the industry — e.g., Quartz Products Corp., Math Associates, Inc., Trompeter Electronics, Inc., Meret, Inc. — but be gobbled up in the next decade when the giants get down to business.

Looking Westward

So far we've mostly discussed North American companies. There are other suppliers of significance beyond our shores, including Plessey, Siemens, Philips and Thompson CSP. But, for several reasons, only the Japanese pose a truly significant threat to U.S. domination of the market:

- Much of fiber optics success will lie with the electronics. While the U.S. may lead in technology, it's only by a gap as large as the U.S. once led Japan in computer technology.
- Japan is pinning much of its future economic well-being on advances in information processsing and consumer electronics. Both are related to fiber optics.
- Japanese beachheads in U.S. communications and computer industries will provide at least the seeds of a captive market.
- Some of the most ambitious fiber optics applications are underway in Japan. For example, an interactive CATV project is being sponsored by

the Ministry of International Trade and Industry near Osaka.

• Japan is a world force in related technology, such as copiers and facsimile.

The Promise

Like many a fledgling industry, fiber optics has its cadre of true believers. Some see it as promising the biggest change in electronic communications since the invention of the radio. The technology is new and elegant, the demand for communications ever growing.

Fiber optics already makes sense in some first-generation manifestations, where the technology is force-fit to current applications. When new applications spring up, the vision of fiber optics' staunchest supporters may pale in comparison with reality. It has been that way with technological breakthroughs from the printing press to the computer.

Until then, fiber optics will have to overcome some substantial resistance, including:

• The chicken-and-the-egg cost problem. Everyone knows that volume production would only lower costs. But only lower costs will produce volume orders. *Hence, the importance of captive markets.*

• The status quo. Specifically, it's entrenched. There is inertia on several fronts: the telephone industry's long depreciation cycles; designer conservatism; manufacturing hegemonies in cable and switches; standards and procedures in current applications, as in computer interconnection and CATV distribution. *Past investments must be considered* by those wishing to switch to fiber optics.

• The interface problem. The communications environment developed around twisted copper wire-pairs of certain bandwidth. It will be equipment designed for that environment (and designers used to working with it)

(Continued on In Depth/10)

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IN DEPTH

(Continued from In Depth/9)

that will first interface with fiber optics. The infrastructure is not there to freely utilize the incredible bandwidth made possible by fiber optics dielectric properties.

Fiber optics today is analogous to early television, where networks, standards and medium-specific programs had yet to develop.

Optical Integration

Other high technologies have come and gone — this film memory, for example. Others, such as amorphous semiconductors and holographic memories, have yet to develop as once touted. Will the same happen to fiber optics?

No.

For one thing, the economic benefits are too readily obvious even now. For another, there is a lot of corporate mass behind its development. Some of the developments that will make the benefits of fiber optics even more tangible are:

• **The energy crisis and scarcity of metals.** The replacement of travel by electronic means will require some cheaper wide-band communications for video transmission. Fiber optics can provide it. The rising prices of copper will continue to narrow the gap between fiber optics and twisted wire-pairs (See Figure 8), adding a salvage benefit to replacing copper wire.

• **Ancillary technologies.** Only the making of the fiber itself, of the subindustries of fiber optics, is unique to fiber optics. Semiconductor advances in light sources and detectors for display and copier systems, for instance, will have spillover in fiber optic uses. So, too, digital switching in telecommunications.

• **Optical integrated circuits.** Such circuits will do to photon (light) current what today's semiconductors do to electron (electrical) current: modulate, amplify, switch, filter and delay. As far back as 1976, AT&T talked in its annual report of the possibility of making telephone central switches that operated on light waves rather than electricity — "optical computers." (The Naval Research Lab has already demonstrated the seed components of integrated optical signal processors, which could lead to all-optical readers.)

Meanwhile, fiber optics — technology and business — will chug along in the everyday world.

In the decade just ahead, this new method of comunications that is as old as the hills will take its place in the hierarchy of communications methods.

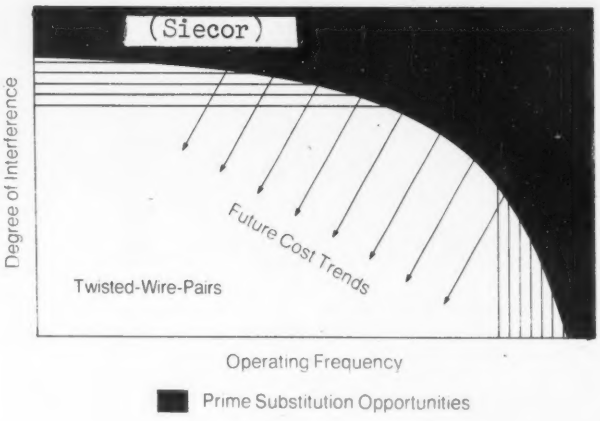
And in the decade after that, it may rise to the top of that hierarchy. When you get right down to it, fiber optics is amazing.

John Gantz is editorial director of International Data Corp. (IDC), Waltham, Mass., a data gathering and publishing organization for the information processing industry.

Gantz oversees all of IDC's newsletters and reports to industry. He authored IDC's report Fiber Optics — An Uncomplicated Guide, *from which much of this In-Depth was adapted.*

When not hiking the full length of the Appalachian Trail, Gantz participates in executive conferences, speaks regularly on distributed data processing and data communications and contributes frequently to the business press.

Gantz holds an A.B. degree from Dartmouth College.



Conventional conductor technologies are represented by the entire area of the chart. The shaded area shows the prime substitution opportunities for optical cables.

First is for the coaxial cables used where signaling rate exceeds 1 to 10 MHz, about 20% of the total.

The other is the 10 to 20% of the applications that must now curtail severe interference problems by shielding, by derating systems performance or with special operating procedures or software measures.

While complete displacement of copper is not foreseen, the applications where optical cables provide cost-performance superiority will increase until they become dominant.

Figure 8

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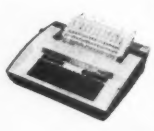

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MINIWORLD

'Small System for Large Users'

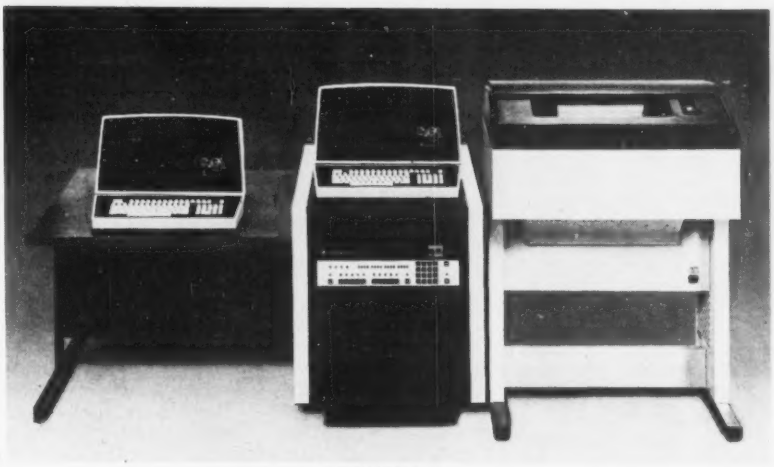
CA Unveils Scaled-Down Version of Syfa

IRVINE, Calif. — Attempting to bring more computing power to smaller business applications, Computer Automation's Commercial Systems Division has unveiled a scaled-down version of its Syfa network processing machines.

Scheduled to be officially introduced at next week's Information Management Exposition & Conference (Info '79) in New York, the JR-200 was designed to operate with two to four terminals in a stand-alone mode rather than as part of a widely scattered decentralized network. While the 64K-byte unit has the same basic CPU as its DSK-32 and DSK-300 brothers, it has neither the communications capabilities nor the disk storage capacity of CA's larger machines.

Billed as "a small system for large businesses," the JR-200 utilizes the same Sybol business-oriented programming language as the parent Syfa and the same system software. The junior offering also uses the firm's Syclops operating system, but in a scaled-down multitasking form. In effect, the machine can simultaneously juggle four interactive processing jobs, one spooled printer job, one background batch utility and one remote job entry application, according to a spokesman.

The system includes 32M bytes of Control Data Corp. on-line disk storage and is structured to compete against such systems as Datapoint Corp.'s 5500 and 6600, Honeywell, Inc.'s Level/6 and Data General Corp.'s CS/40 and CS/60.



Syfa JR-200

The JR-200 is offered in two versions: one with a 150 char./sec bidirectional printer and one with a 600 line/min unit. Prices for those systems are about $29,000 and $39,000, respectively, the spokesman noted.

For those users who purchase the junior system and want to upgrade to the larger DSK-32 network, CA has an upgrade package that consists of new cabinetry, a different power distribution system, a new disk controller and an asynchronous muliplexing unit. Considered to be a major alteration, the conversion costs about $20,000.

Additional information on the JR-200 and other Syfa systems can be obtained from CA's Commercial Systems Division, 2181 Dupont Drive, Irvine, Calif. 92713.

Show Attracts Mixed Crowd With Business, Hobby Gear

By Tim Scannell
CW Staff

BOSTON — Minicomputer-based business systems, computer-produced biorhythms and video games made compatible bedfellows here recently as the Northeast Personal & Business Computer Show rolled into town and played to a mixed crowd of computer enthusiasts.

Colorful, stick-on badges distinguished the buyers from the lookers as thousands of people swarmed up and down aisles filled with everything from complete turnkey systems to shoe boxes jammed with switches, chips and various other microcomputer parts. While the show's sponsor, Northeast Exhibitions, said it had reached its attendance goals, officials refused to release exact figures, explaining that it was against show policy to quote meaningless numbers.

About 150 vendors and exhibitors attended the three-day show, including such firms as Burroughs Corp., Memorex Corp. and Wang Laboratories, Inc. However, although straight business system vendors and distributors attracted a healthy portion of the audience, the majority of attendees

CW at Northeast Computer Show

seemed to be more interested in which company had the latest software games or could synthesize the loudest music.

In fact, some exhibits that drew the largest crowds were a $13,000 electronic desk, a voice-activated microcomputer that could simultaneously do payroll and make coffee and a stand set up by Miles Laboratories to dispense Alka-Seltzer by the pitcher to

(Continued on Page 52)

CW Photos by A. Dooley

Attendees crowd the aisles at Northeast Personal & Business Computer Show.

Micos Aimed At Small Users Starting Into DP

ELMSFORD, N.Y. — A small business system for the first-time computer user has been announced by Mini-Computer Systems, Inc.

The Micos 75 can also be used as a remote data entry and storage device communicating with another Micos system or with a host mainframe, the firm said.

In its basic configuration, the system includes a CPU with 64K bytes of MOS memory, one Midas CRT terminal, 10M bytes of disk storage (five fixed and five removable), a 150 char./sec matrix printer and the Micos operating system.

The Midas CRT terminal features 24 lines of 80 characters each, a 12-key numeric pad and transmission speeds up to 960 char./sec.

The printer produces up to 132 char./line, six vertical lines per inch, 9 by 9 dot matrix characters and offers vertical forms control.

The Micos 75 workstation features a terminal design that allows the operator to adjust the height and angle of the screen, and the CPU console switches have been reduced in number from more than 20 to three, the vendor noted.

System options reportedly include a second Midas CRT, a 180 char./sec or 300 line/min matrix printer and Mtam, a synchronous communications package using the IBM 2780 communications protocol.

The Micos 75 system is fully software compatible with other members of the Micos family, according to the firm, and users can upgrade to a Micos 100, 200 and 300 system without software changes.

The price of the basic configuration is $26,600; delivery is scheduled to begin in November.

Mini-Computer Systems, Inc. is located at 399 Fairview Park Drive, Elmsford, N.Y. 10523.

Potential Users Versed on Avoiding Pitfalls

By Tim Scannell
CW Staff

BOSTON — Bombarded by tales of computer-botched payrolls, damaged data bases and other DP nasties, the average small business person tends to shy away from the lure of digital systems. In fact, anybody older than 30 is probably afraid of computers and those more than 40 are terrified.

These are the views of Richard F. Brown, president of the Computer Store, Inc. in Burlington, Mass., and one of several speakers who delivered a series of "tech-talks" at the recent Northeast Personal & Business Computer Show here.

Addressing an audience of small business executives, Brown pointed out that since there are "no free lunches" in DP, buyers should look beyond the technical issues when examining a minicomputer-based business system. Everybody builds computers out of chips, metal and integrated circuits, he explained, but the difference between vendors is in the quality of service and availability of field support.

Potential users should be just as concerned about a seller's track record as they are about software programs and printer speed because in the long run it is the machine's warranty that counts and not its processing powers, Brown warned.

Stressing that future users should engage in some computer sleuthing prior to signing any contracts, Brown recommended obtaining a list of current system owners. Furthermore, buyers should investigate the sellers' equipment to see if they are using the systems displayed on their store floors. He claimed that he had found at least two companies that were selling one type of system while they had another "buried in the cellar."

Background of Software

Since very few small systems vendors produce their own software, buyers should know just who generates it and where it comes from. Complete documentation is also important, Brown said. "I'd like to know that the fellow who generates the software is either the manufacturer or a reputable vendor."

On the subject of software, the Computer Store's president observed that most research and development by vendors goes into documentation, and much of that is extremely confusing to the small business person. Describing minicomputer software documentation as "horrendous" in the small business market, Brown said it is almost always written by a technical person and "usually can only be understood by another technical person."

However, executives shouldn't ignore prepared software packages in favor of writing their own routines, he warned. "I've seen more people get into trouble from writing their own software."

Finally, Brown wrapped up his 30-minute talk by pointing out that computers are no longer "esoteric" and that 90% of the small business systems are run by a company's bookkeeper, clerk or someone with little or no computer training.

The most important thing is to "buy from a vendor you feel comfortable with," one that is totally accessible when the software or hardware going gets rough, he said.

Give us your slogans, your thoughts, your witty-one-liners yearning to breathe free.

Enter the 1980 Computerworld button contest.

Every year, as all you button freaks know, Computerworld distributes tens of thousands of buttons (at no cost, we like to point that out) at NCC, the Computer Expos and other trade shows across the country. A whole generation of computer people have come to look for these buttons, and they have become a tradition in the industry.

This year, we're going to give you a chance to participate in the tradition. We're looking for good button suggestions—funny, relevant and at least moderately clean—for consideration by our experienced panel of judges. (Examples of buttons we've used are shown.) As many as six suggestions will be chosen by our judges (based on criteria known only to them), and if your entry is among those picked, you will receive a certificate of appreciation suitable for showing off to your friends.

In addition, all the people who submit winning entries (including all duplicate entries) will be thrown into a hat (or at least their entries will) and six lucky winners will be drawn more or less at random (we never said the judges were fair). These six lucky souls will receive a free hand-held computer game valued at well under $100 if we can do it.

You may *not* enter as many times as you like because we know you have computers and can run off huge numbers of entries which will drive us crazy. So only two entries are permitted per person and all entries must be received on the official order form or a copy thereof. All decisions of the judges are considered final, and no representation as to their competence, skill or fairness are being made. Deadline for entries is November 15th 1979 in our offices in Newton.

Yes, I'd like to enter Computerworld's ridiculous button contest. I hope your judges can read. Here is my entry (if you have more than one, please put them on separate forms).

_____

_____

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Company_____

Address_____

City_____ State_____ Zip_____

Send to: Jack Edmonston, Sales Promotion Dept., Computerworld, 797 Washington Street, Newton, MA 02160

Shows Draws Mixed Group

(Continued from Page 51)

floor-weary individuals.

While the show itself was successful, many exhibitors claimed that it attracted more T-shirted and plastic-bag-toting hobbyists than they had expected. Roger Sanford of Tandy Corp.'s Radio Shack pointed out that he had encountered a 50-50 mixture of business and "specs-oriented" people, the latter being more interested in the firm's TRS-80 Model II's cycle speeds than its accounts payable and general ledger prowess.

At Control Data Corp.'s Data Products Group booth, the majority of questions seemed to focus on the "how much equipment for how little money" aspects of a minicomputer system. According to sales representatives Bob Babin, many of the people that approached his booth had "absolutely no idea of the magnitude of CDC's operations." Some even likened the manufacturer to companies the size of Radio Shack.

Referring to the show, the CDC spokesman noted that "any kind of exposure [for the firm] is good," but whether the exhibitors will recoup the exhibition money "remains to be seen."

A few aisles over, Burroughs demonstrated its B80 and B800 minicomputers, as well as its entry-level disk systems. Although salesman Jeff Roy admitted that the type of crowd on the floor wasn't exactly what Burroughs aims for or had expected, he observed that there were enough business inquiries to keep the sales staff busy.

However, at least one vendor was thoroughly satisfied with the regional presentation and its mixed bag of attendees. Len D'Innocenzo, vice-president of Information Technology, Inc. (ITI) described the event as a "seller's show" and called it the best computer production in seven years.

D'Innocenzo stated that he was pleased that most people at the show appeared to have done their technical "homework" and pointed out that ITI had sold about 28 of its Superbrain intelligent terminals within hours after the show's start.

Northeast Personal & Business Computer Show

A CW Photo Feature
By Ann Dooley

Tom Gunn helps his five-year-old son Ben learn about computers.

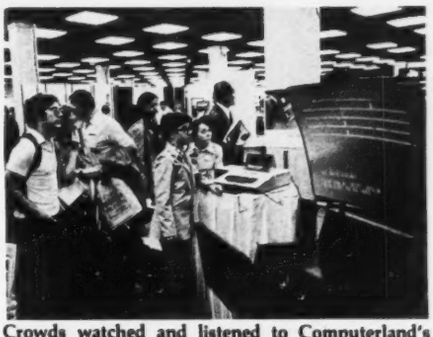
Frank Stout, Gary Walsh and Dick May examine Radio Shack TRS-80 equipment.

Bob Ramsdell of the Computer Store puts an Apple Computer, Inc. Apple II through its paces.

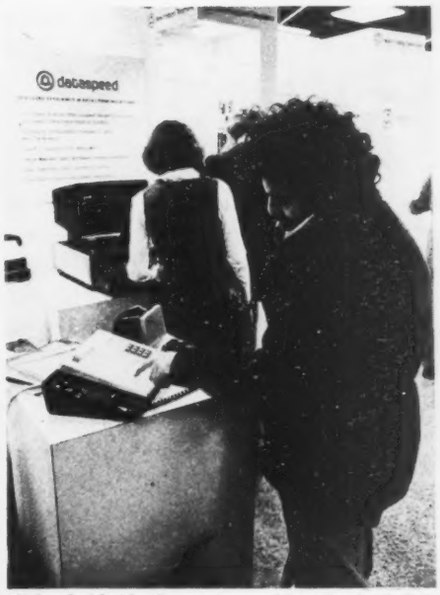
Qantel Corp;'s Robert Mulvany demonstrates the Model 965 CRT.

Piles of merchandise lined show aisles.

Mark Goldstein talks to Albert the Office, part of automated office display.



Crowds watched and listened to Computerland's Apple II and Alf music synthesizer display.



Richard Abaid phones in on New England Telephone's Touchamatic.

Gains Control, Money Savings

HMO Drops Service Bureau, Goes In-House

Special to CW

DETROIT — With nearly 30,000 members, a constant mountain of administrative paperwork and rising service bureau costs, a health maintenance organization (HMO) here decided to abandon off-site computing and bring its DP home.

For a number of years, Comprehensive Health Services of Detroit (CHSD) relied on Computeristics, a service bureau subsidiary of Uniroyal, Inc., to perform its DP tasks. While the service bureau's IBM 370/158 managed to keep ahead of CHSD's forms flood and also provided needed demographic, financial and insurance data, the HMO wanted more control and a cost-effective way to develop new applications.

Since purchasing an expensive, large-scale system was out of the question, the organization concentrated its search on minicomputers. After examining some 40 systems and eliminating all but three after checking on field service availability, CHSD selected a Data General Corp. Eclipse C/330.

While the system search was going on, Computeristic was branching out into turnkey health care packages and selected DG as its vendor, according to Roger Mabin, CHSD's director of data processing. Since this was the case, CHSD decided to contract with its former service bureau to install both the hardware and the software and convert the HMO's existing enrollee tracking system to the small machine. The company was also instructed to develop some new on-line applications.

Three-Month Conversion

The interactive system installed at CHSD includes the Eclipse with 512K bytes of memory, two disk drives, each with 192M bytes of storage, a 600 lin/min printer, three DG Dasher consoles and 20 Dasher CRTs.

Computeristics programmers spent about three months converting the tracking system from the IBM mainframe to the Eclipse. They also developed on-line eligiblity confirmation programs and ran the system in parallel with the service bureau's activities.

With the on-line confirmation capability, CHSD can determine immediately if a patient is enrolled in the HMO plan. When a patient arrives at CHSD, an admitting clerk keys the person's identification number into one of the CRTs.

The system responds, showing the patient's name and address as well as other pertinent demographic information; the CRT display confirming the patient's eligibility can change quickly, depending on their current financial situation.

Elaborate Billing

Joanne Wallace, director of planning development, pointed out that since many of CHSD's patients are served through a contract with the Michigan Department of Social Services, they are billed monthly under a very elaborate billing procedure.

First, the sum and substance of the enrollee system is reproduced on magnetic tape, which is them sent to the Social Services Department. This allows the state to ensure that every one of CHSD's clients is covered by the state.

From these reports and others, the state can find out the age of each patient to determine which welfare program covers the expenses.

So far, the DG hardware and Computeristics software have filled their promise for CHSD, Mabin stated. Every system will go down once in awhile, especially in the beginning, but when this one has, the field service personnel "come out to service the machine and get it back on the air in record time," he said.

Using such industry-standard languages as Fortran and Basic, CHSD's DP department has written a variety of new programs. Among them are some financial forecasting routines, computer-assisted budget preparation programs and mailing label and utility packages, Mabin said.

Fortran is also being used to create an index file for the tracking system's inquiry program.

Some of the service bureau-installed Cobol applications have resulted from ad hoc requests, the DP director said. "For example, if our subscribers go to a hospital a number of times, we can see how many times they've been admitted. That information can be related to their age and sex to see if any correlations appear.

"We can also relate that information to the physician to determine if certain doctors are overutilizing the hospital."

In future, a full-scale utilization system will be developed to identify all procedures being performed by the HMO and relate them to the age and sex of the patient. This will not only help the HMO to determine staffing requirements, it will also help it keep better track of the staff physicians to ensure that they are seeing the right number of patients and giving them the right amount of time, Mabin said.

Procedures will be related to hospital stay so the organization can see if patients are being held too long in the hospital, he continued.

CDC Add-On Fits LSI-11s

MINNEAPOLIS — Control Data Corp. has introduced an add-on memory available in either a 64K- or 128K-byte capacity for Digital Equipment Corp. LSI-11, LSI-11/2 and LSI-11/23 microcomputers.

The CDC 94123 memory has an increased addressability up to 256K bytes and is organized on a dual board, taking a minimum of processor card slots, a spokesman said. The unit features on-board parity and refresh circuitry.

The 64K-byte version of the CDC 94123 is priced at $1,050 from the firm at 8100 S. 34 St., Minneapolis, Minn. 55440.

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Users Underestimate Conversion Costs: Survey

Special to CW

IRVINE, Calif. — In their ongoing quest to get more mileage from the DP dollar, managers frequently consider replacing their existing hardware with more efficient and more advanced processing equipment. But in doing so, they often overlook a major set of costs lurking behind the conversion curtain.

In a recent survey of IBM System/3 and System/32 users who had converted to a System/34, Memorex Corp's Business Systems Division found that a vast majority of these users seriously underestimated the cost of changing from one mainframe to another. In fact, in some cases, the conversion costs were large enough to offset a substantial percentage of the savings expected from the new system's increased memory, expanded applications and faster throughput.

The survey involved 42 IBM minicomputer users and included one System/3 Model 6, 11 System/3 Model 8s, 14 System/3 Model 10s, seven System/3 Model 12s and nine System/32s. The average conversion costs tabulated in the survey varied according to the mainframe model from which the firms converted. Those costs were computed by applying cost estimates of salary and travel expenses and real costs of tuition and equipment travel to the time the survey respondents reported was spent in education, testing, parallel operation and program conversion. The respondents did not report actual dollar amounts.

Surprisingly, although the average conversion costs computed by Memorex ranged from $12,810 to $15,518, only one of the 42 respondents estimated his conversion costs to be more than $10,000. Furthermore, a startling 19 respondents pegged their costs at less than $5,000 — and estimate more than 50% below the lowest average actual cost computed from the responses. Eleven respondents said they did not even know what their conversion costs totaled.

Users Caught Unawares

These figures indicate clearly that most users are not aware of just how costly a system conversion can be. Even more revealing is the fact that 100% of the Model 12 users in the survey and over 70% of the Model 10 users said they plan to convert again — to the System/38 — within the next 18 months.

The question the survey did not answer is, would they have made the interim conversion to System/34 if they had known the extent of the conversion costs?

To arrive at the total conversion costs, the survey was divided into four cost categories: IBM education costs, IBM test center costs, parallel operation costs an program conversion costs.

Of the users surveyed, 39 took advantage of IBM's educational services for an average of 18 days each. By applying an industry average salary for each user ($387 per week, based on an annual salary of $18,000 plus 18% fringe benefits) and average travel expenses of $350 per week to the actual tuition costs paid by users in each System/3 model category, Memorex extrapolated the total education costs shown in Figure 1.

In addition to education courses, 74% of the users surveyed required time at the IBM test center. Using the same factors for travel expenses and salary, Memorex arrived at a systems break down of testing costs. (Figure 2).

In order to minimize the disruption associated with a system conversion, many DP managers opt for parallel conversion, running both the old and the new system together for a period of time. In the survey, 62% of the users did so, and their related costs are broken down in Figure 3.

Program Conversion Hurt Worst

Of the four costs categories, by far the most costly, according to the survey, was program conversion. Outside consultants estimated it takes approximately two hours to convert a single program, including source coding changes, program recompile, job control language changes and in-house testing. Employing this estimate and applying an average of $15 per hour for CPU and operating costs, Memorex established a set of average costs for program conversion (Figure 4).

While the experience of converting to System/38 architecture still lies on the horizon for a great many DP managers, the survey results show that blind conversion — especially to a System/38 — can be the greatest threat to a site's cost-saving objectives. According to the Business Systems Division, the System/3 user converting to a System/38 must deal with incompatible architecture, unbundled software, and data base orientation and must recompile all the programs, change all the operating procedures and retrain the programming and operating staff.

All these things add up to conversion costs in excess of $20,000 for the typical System/3 shop and a reason for DP managers to explore every possible way of deferring those costs as long as possible.

	S/3-6	S/3-8	S/3-10	S/3-12	S/32	Overall Average
Average Weeks of Education	5	3.5	4.8	3.0	2.6	3.6
Average Travel Expenses	$1,750	1,225	1,680	1,050	910	1,260
Average Tuition	$2,827	1,979	2,714	1,696	1,327	1,936
Salary for Education Period	$1,935	1,355	1,858	1,161	1,006	1,393
Total Average Education Costs	$6,512	4,559	6,252	3,905	3,233	4,589

Figure 1

	S/3-6	S/3-8	S/3-10	S/3-12	S/32	Overall Average
Average Hours Per User	80	48	35	64	18	43
Average Travel Expenses	$700	394	308	482	93	385
Salary for Average Testing Period	$774	426	348	503	77	511
Total Average Testing Costs	$1,474	$820	$656	$985	$170	$896

Figure 2

	S/3-6	S/3-8	S/3-10	S/3-12	S/32	Overall Average
Average Parallel Operating Time Per User (in months)	1.0	0.7	1.2	0.2	0.1	0.7
Average CPU Rental During Parallel Operating Time	$1,400	1,470	3,240	700	120	
Average Operator Salary During Parallel Operating Time (based on $12,000 + 18% fringe)	$1,180	826	1,416	236	118	
Total Average Parallel Costs	$2,580	2,296	4,656	936	338	2,503

Figure 3

	S/3-6	S/3-8	S/3-10	S/3-12	S/32	Overall Average
Average Programs Converted Per User	75	325	247	368	238	251
Total Average Conversion Hours	150	650	494	736	476	502
Total Average Conversion Costs	$2,250	9,750	7,410	11,040	7,140	7,530

Figure 4

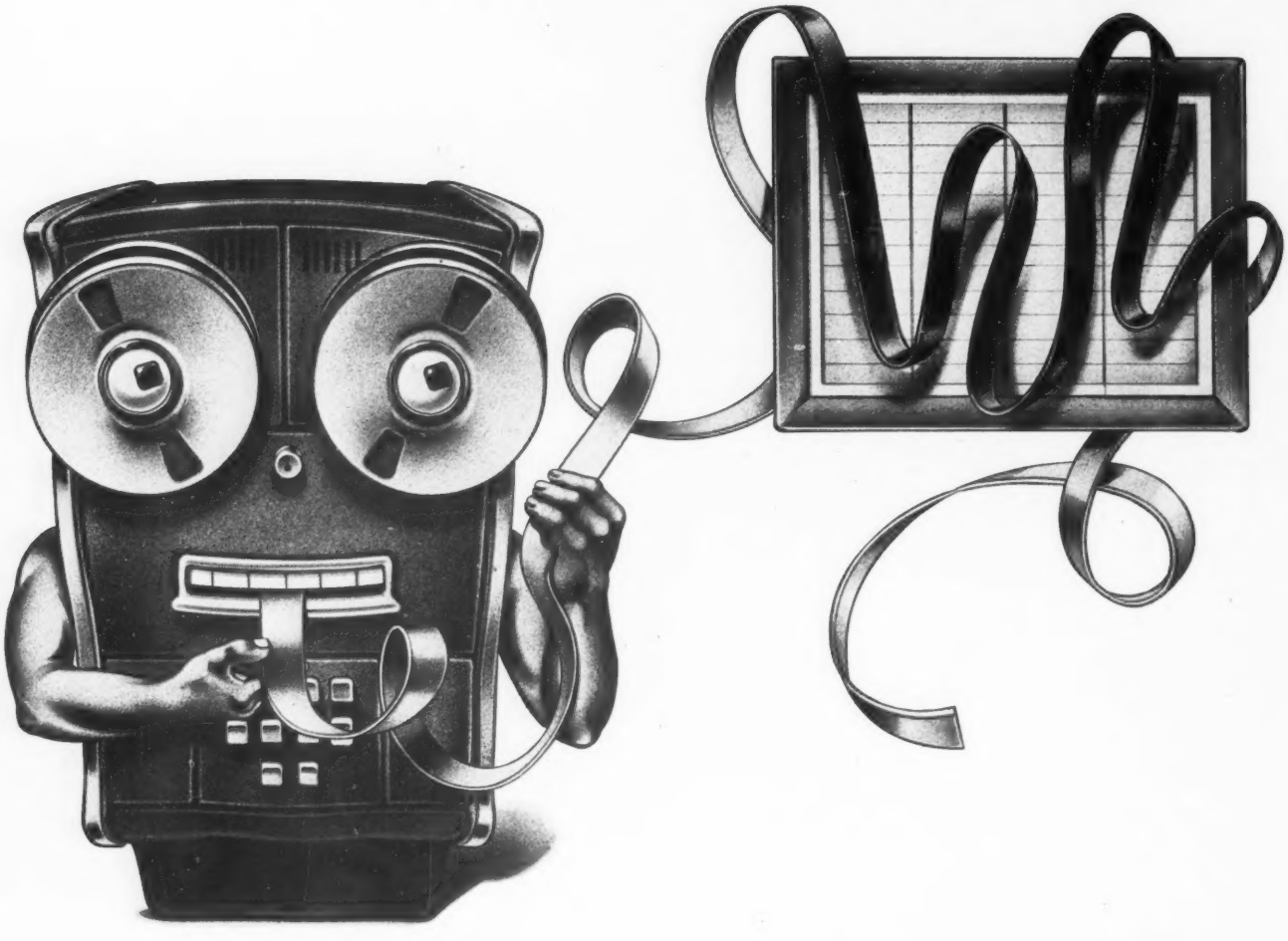
Small Systems Guide Out

CHICAGO — Aimed at those considering the purchase of a minicomputer system, Business Systems Research Group's "Small Business Computer Evaluation Program" is a management-level guide to computer selection that is said to incorporate behind-the-scenes insight and advice.

The 200-page volume contains numerous worksheets and checklists as well as information on minicomputer systems collected from computer salesmen, systems engineers and other people familiar with the construction and benefits of a business system.

The ring-bound evaluation costs $59.95. However, a brochure describing the program, entitled "What You Really Need to Know About Small Business Computers," is available free from the company at 444 N. Michigan Ave., Chicago, Ill. 60611.

How to help your corporation make sense out of the future.



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Fee Could Reach $2,500 per Peripheral

TI Hikes Maintenance for Others' Gear

By Tim Scannell
CW Staff

HOUSTON — Texas Instruments, Inc. recently introduced a customer peripheral policy that could discourage OEMs and end-users from adding non-TI products to that company's systems.

According to the policy, circulated several weeks ago, customers that attach to TI processors peripherals not distributed or manufactured by TI are subject to a one-time fee of up to $2,500 per peripheral. Customers which refuse to pay TI's Installation Support Rate fees on added equipment exempt that piece of hardware from TI's regular maintenance agreement and in some cases risk losing TI maintenance coverage on the entire computer system.

Although TI has explained that the majority of OEMs and end users have accepted the policy, a number of smaller systems integrators have grumbled about TI's additional fee. At least one OEM has accused the Houston-based firm of using strong-arm tactics to try to discourage customers from purchasing equipment from less expensive, non-TI sources.

Scheduled to take effect Jan. 1, the Customer-Furnished Peripheral Policy applies to OEM- or end-user-supplied disk drives, line printers, card readers and programmable Data Access Arrangements (DAA). In a copy of the policy obtained by *Computerworld* and directed at peripherals compatible with TI's Series 990 microcomputer-based systems, the firm stated that any customer who fails to pay the installment fee on a disk drive not distributed by TI will forfeit the regular systems maintenance contract in favor of on-call maintenance.

Under this type of service, all the user's equipment will be maintained from the closest field office at which TI has support for that product. The user will be billed at current field service rates for travel, on-site labor and materials. The policy also specifies that at no time "will [TI] assume . . . responsibility for being able to maintain or repair this [type of] configuration."

Furthermore, if a customer refuses to pay the extra fee for a non-TI line printer or card reader, that peripheral will also be exempt from the maintenance agreement and be covered by On-Call service only, the policy pointed out. In addition, if at any time a customer installs a foreign interface or modifies a TI interface on the computer, the entire system's maintenance support will revert to On-Call status.

In order for any TI equipment to be covered under the company's 30-day or 90-day warranty for OEMs and end users respectively, the customer must adhere to TI's "Installation Support Rules," which include paying the fee.

Effect on OEM's

Although TI defended the policy as a means of "recovering our costs whenever we are maintaining equipment," an OEM source, who declined to be identified, claimed the firm's new policy would increase the price of a typical turnkey system sold by his company by about $2,300 — a cost that would undoubtedly be passed along to the user.

And if an OEM were to purchase a complete disk system — consisting of a Century Data Corp. T-50 drive, a cabinet, a daisy chain, radial cables and one disk pack — from TI, he would have to pay about $14,000 as opposed to approximately $6,800 if the equipment were acquired directly from the vendor, the source said.

In addition to zeroing in on peripherals from Century Data, the policy also lists equipment from Control Data Corp., Dataproducts Corp., True Data Corp., Elgin Electronics, Inc. and General Datacomm, Inc. as being subject to the installation and support fee.

The TI spokesman noted other vendors are using similar policies or premium plans to recoup foreign peripheral maintenance losses, although none of these vendors were identified.

Vector Graphic Answers Lawsuit

WESTLAKE VILLAGE, Calif. — Vector Graphic, Inc. has filed a $30 million cross-complaint against Michael Shrayer Software, Inc. of Glendale, Calif., after that company charged Vector Graphic in civil court with breach of contract, fraud and deceit.

In its suit, Michael Shrayer Software asked for $1,094,00 from Vector Graphic, claiming the source code in Vector Graphic's Word Management and Memorite word processing (WP) systems is the same, "byte per byte," as that in its own Electric Pencil II WP package. Michael Shrayer Software also maintained Vector Graphic was a nonexclusive distributor of the original version fo the Electric Pencil II and failed to pay the appropriate license fees.

Vector Graphic, on the other hand, contends no such agreement ever existed between the two companies. It is also charging Michael Shrayer Software with libel and with interfering with its client/vendor relationships.

"Although there is some similarity between the Vector Graphic word management systems and the Electric Pencil II, not one byte of code has been utilized or copied by Vector Graphic from the Shrayer model. Moreover, such similarities are shared by every word processor currently in use, regardless of the manufacturer," according to Dr. Robert Hart, chairman of the board for Vector Graphic.

Michael Shrayer Software offered no further comments because the case is in litigation.

Reversion to Past Techniques Urged for Marketing in the '80s

By Molly Upton
Special to CW

SAN FRANCISCO — To successfully market rapidly advancing electronics technology in the 1980s, selling approaches must drastically change.

Panelists at a recent conference session here called for a return to two fundamental marketing principles that seem to have been forgotten: motivating a sales force and creating a marketing organization in which distributors, the direct sales force and manufacturers' representatives work in concert.

Anthony Hamilton, president of Hamilton/Avnet Electronics, called the '80s and era of crisis, or at least reevaluation, for the distributor.

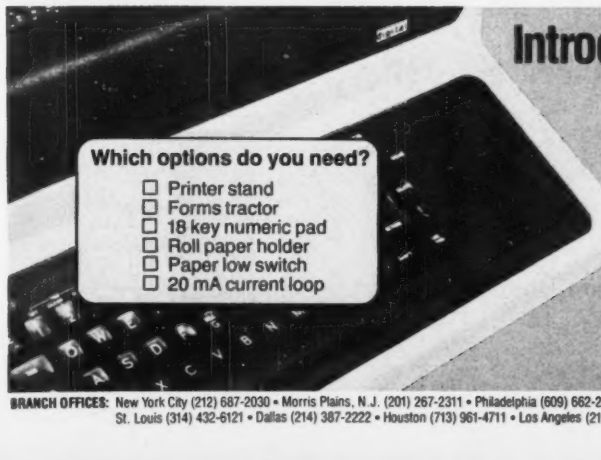
With suppliers letting six or more distributors into the marketplace, it appears the industry is returning to the 1950s, when distributors of tubes were too numerous for profitability and many carried tubes of dubious source and reliability.

The supplier and the distributor should not compete; the supplier should not regard the product as sold until it reaches the customer; and the supplier should encourage its sales force to work with the distributor, Hamilton said.

It makes sense that the distributor carry an entire line of products and an abundant stock, the same literature as the supplier and the same knowledge of a product's selling points. In this way, the distributor could provide value-added service, he observed.

But if there are multiple distributors, the distributor is not inclined to stock appropri-

(Continued on Page 62)



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Adapso Meet Kicks Off Oct. 22

COLORADO SPRINGS, Colo. — The Association of Data Processing Service Organizations, Inc. (Adapso) will kick off its 51st Management Conference on Oct. 22-24 at the Broadmoor Hotel here.

Speakers will include Archie McGill, AT&T vice-president of marketing, who will discuss "The Golden Age of Data Communications — The '80s," looking into the future of the communications and computer services industries.

Vance Packard, author of *The Hidden Persuaders* and *The Status Seekers*, will talk on the impact of technology on the U.S. in the next decade, while Jude Wanniski, president of Polyconomics, Inc., will present his theories on the global economy.

Concurrent workshop sessions on Tuesday and Wednesday will cover such topics as structured software marketing, intercompany sales opportunities and the reality of a public offering.

The conference will also examine management issues relating to microcomputer directions, contracts and operating management.

Additional conference information is available from Marilyn Williams, Adapso, 1925 N. Lynn St., Arlington, Va. 22209.

Designers' Use of RAMs Seen Hinging on Easy Use

By Molly Upton
Special to CW

SAN FRANCISCO — Designers of microprocessor systems will embrace dynamic random-access memories (RAM) if and when they are easy to use and makers are attempting to satisfy these needs, panelists said at a recent conference session here.

Dynamic RAMs need refreshing and have been used heavily by minicomputer and mainframe makers who found the overhead operations of little consequence.

The 8-bit microprocessor designer has favored static RAMs, which do not need refreshing and thus have fewer associated requirements. With the advent of the 16-bit microprocessor and its expanded address capability, however, the question now becomes whether to cope with dynamic RAMs, use a pseudo-dynamic RAM or stick with static RAM.

Damon R. Ujavarosy, engineering project manager for Hewlett-Packard Co.'s desktop computers, described the advantages of static and dynamic RAMs. Static RAMs are easy to use and offer high speed, whereas dynamic RAMs have advantages in cost and power per bit and packing density, considering the amount of memory that will be used with 16-bit microprocessors, Ujavarosy said.

Dynamic RAMs will be the most cost-effective to use, Ujaravosy said, but admonished that "memory manufacturers need to make support chips to make dynamic RAM systems easy to design."

Interface Problem

The problem with using dynamic RAMs in small systems is that these memories are unable to directly interface to microprocessors, according to Lance Flores, senior applications engineer at Mostek Corp.

Different data-capture relationships to MPU clock and read/write signals among various microprocessors make it "impossible to completely satisfy the requirements of any one processor without losing compatibility with most others," Flores said.

Therefore, it is best to design a part that lends itself to needs common to various micros, such as implementation on a bus.

Correction

The headline "REI Facing Unprofitable Year," which appeared in the Sept. 24 issue, may have been misleading. The company reported lower earnings than last year, but is still profitable.

FORTRAN USERS WHO CARE ABOUT MONEY TURN TO PAGE 26

Including Memory Expansion, Interface

Periphonics 'Unbundling' System Peripherals

BOHEMIA, N.Y. — Periphonics Corp. is offering several peripheral products formerly available only as part of its T-Comm 7, a PDP-11-based communications control system, on an individual basis.

Among the peripherals that now can be purchased separately are the Peripacs memory expansion/management system and the IU 360/370 channel interface unit.

While these products are available to end users, the firm's primary marketing thrust is to OEMs, marking Periphonics' first OEM sales effort at the component level, according to Louis Alquist, who was appointed to direct this effort as manager of component sales.

Alquist, formerly a system engineer in the T-Comm division, said Periphonics previously sold only system-level products to the OEM market, via direct sales in the U.S. and through Menzies Corp., which markets an order entry system based on the T-Comm 7, in the UK.

Currently, systems- and component-level marketing is handled through Periphonics' national OEM sales organization, but Alquist plans ultimately to hire a dedicated sales force and technical support staff for OEM component products.

DEC OEMs Targeted

Because T-Comm peripherals are designed to interface to PDP-11- or LSI-11-based systems, Periphonics is targeting its component-level products to OEMs with similar Digital Equipment Corp. equipment.

Alquist indicated Peripacs and the IU 360/370 can be modified to interface with other minicomputer-based systems such as Data General Corp. Nova machines, but the firm has yet to do so.

Nevertheless, he sees market potential for the two products and expects this year to do $2.5 million worth of OEM business, divided about equally between component-level and T-Comm 7 system product.

Alquist claimed an advantage Peripacs offers OEMs is that it plug-connects directly into the Unibus of PDP-11 systems and can be used in conjunction with or in place of DEC's memory management processor. Available in 64K-byte increments, Peripacs can be expanded to 2M bytes, compared with a maximum 256K bytes with the DEC memory management technique, he said.

Peripacs lists for $5,950 for a 32K-word unit and controller, with OEM quantity discounts available.

The IU 360/370 channel interface enables PDP-11-based systems to communicate with any IBM 360 or 370 processor and costs $12,000, again with quantity discounts available.

On a yearly contract basis, the firm will also offer OEMs maintenance support for a monthly fee covering installation, spare parts and training.

Training Course Ready for Firms Selling DDP

LOS ANGELES — International Data Corp. (IDC) has joined with National Training Systems (NTS) to produce a research and training program for companies selling computer equipment geared to distributed data processing (DDP) applications.

Aimed at novice and experienced sales and marketing personnel, the course will examine the sales tactics of various manufacturers as well as the buying criteria of companies that use distributed processing systems.

Spearheading the project are John E. Rehfeld, vice-president of the Western Regional office of IDC, an information processing industry research and consulting firm, and Ron Posner, president of NTS, which designs learning systems for the DP field.

The joint venture involved development of audio cassette tapes, manuals, workbooks and mastery tests for a six- to eight-hour course covering terminology, market factors, case studies and selling strategies.

Program formats will be structured for home or office use by individual sales people, as well as for presentations during sales meetings or in-house training sessions.

"A new selling strategy is required for the DDP environment," Rehfeld said. "Buying influences vary from the central site to the remote users and are often nationwide, cutting across traditional vendor sales territories."

Agreeing, Posner said he supports the need for a training program because "sales people usually have product-oriented backgrounds, not the system sales experience needed to compete effectively in the applications-based DDP environment."

IDC projected DDP product shipments will swell from $620 million in 1970 to more than $3 billion by 1983. Of 100 corporate-level management information system (MIS) directors interviewed by IDC, 53% have begun implementing DDP.

Additional information on the training program can be obtained from Rehfeld at IDC, 1541 Westwood Blvd., Los Angeles, Calif. 90024.

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Working on Software

Calculator Makers Seen Moving Into Support

By Molly Upton
Special To CW

SAN FRANCISCO — Vendors of hand-held calculators are taking more pages from the computer industry's handbook on creating OEM software markets and designing and supporting systems, speakers indicated at a recent conference here.

Texas Instruments, Inc. realizing there are far more applications for its products that it could develop programs for, has developed the tools and support needed by software entrepreneurs, according to Richard D. Cuthbert, applications manager of TI's Professional Calculator Division. These include its firmware, which is mass-production and low-cost — $25 for software and $48 for the medium.

Technical support is available in the form of emulators, training, technical advice and custom accessories, he said. The company also targeted several industries likely to use its calculators, including the oil drilling, technical selling, aviation, military, construction and finance industries.

TI is trying to extend this approach to other lines, such as simple, dedicated calculators. It also wants to lower the price of firmware modules and make available less expensive emulation equipment, Cuthbert said.

In addition, the company is "experimenting with ways for software houses to capitalize on their existing product investment. For example, we have a cross-compiler under test that will convert Ansi Basic to TI-59 keystroke language," he stated.

Pushed Over Edge

David Conkoin and Bernard Usch of Hewlett-Packard Co. said the recent advances in hand-held calculators "have pushed us over the edge from sharply defined, self-contained products into the systems world."

The systems nature of, for example, the HP 41C, "demands a higher level of ongoing commitment and support from the factory than was necessary for self-contained products."

Some of the recent advances include alphanumeric displays, more read-only memory (ROM), the ability to redefine keyboards and the ability to connect external devices.

For instance, the TI-59 can accept a 20-col printer through its battery door and software ROMs through a separate port. The HP 41C has four general-purpose ports that can accept a printer, card reader, bar code reader, additional random-access memory (RAM) and application software ROMs.

Semi Conference To Spotlight VLSI

PHOENIX — The impact of very large-scale integration (VLSI) on the computer industry will be one of the themes of the fifth annual Semiconductor Industry Conference to be held on Oct. 17-19 at The Pointe Resort here.

The conference will also examine the impact of VLSI on major semiconductor manufacturers and on the European electronics community, as well as the external needs of VLSI makers.

Among other topics to be covered are analysis and trends of semiconductor consumption, plus international trade in the 1980s as viewed by a U.S., Japanese and European company.

Scheduled speakers include Robert N. Noyce, vice-chairman of Intel Corp.; Richard Clayton, vice-president of computer systems development at Digital Equipment Corp.; Pierre Lamond, vice-president and technical director of National Semiconductor Corp.; W.J. Corrigan, president of Fairchild Camera & Instrument Inc.; and Alfred J. Stein, vice-president and general manager IC Division, Motorola, Inc.

The conference is sponsored by Dataquest, Inc., a research and consulting firm. More information is available from Kathy Davis, the conference coordinator, at Dataquest, 19055 Pruneridge Ave., Cupertino, Calif. 95014.

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Alternatives to VLSI Seen For Expanding CPU Power

By Molly Upton
Special to CW

SAN FRANCISCO — Systems designers of number-crunching machines can now take advantage of a number of devices and schemes to expand computing power rather than wait for very large-scale integration (VLSI), according to panelists at a recent conference session here on high-speed, low-cost number crunchers.

Among the approaches advocated by the panel are the use of many "dissimilar" large-scale integration (LSI) units in parallel and the use of shift matrix chips for floating-point instructions.

Other recommended approaches included using programmable array logic (PAL) instead of programmable read-only memories (Proms) and exploiting LSI memory components today instead of waiting for arithmetic devices.

Despite the differences in approach, the panelists agreed advances are being made with number crunchers and that the machines do not have to be priced astronomically high.

C. Norman Winningstad, chairman of Floating-Point Systems, Inc., defined a number cruncher as a computer capable of at least "1 million single-precision [32-bit] floating-point operations per second [megaflops] on nontrivial algorithms such as the FFT and matrix in verse."

Winningstad advocated using a number of dissimilar LSI units in parallel with some pipelining, rather than multiple paralleling of identical LSI units. The latter approach carries a cost in performance and a high software cost, he said.

He hopes to apply 3-micron VLSI design principles to medium-scale integration (MSI) and LSI arithmetic building blocks, which he feels will permit faster processor development than VLSI.

Using Normalization Scanner

Chuck Hastings of Microcomputer Systems Corp. said it is now feasible to design a very high-speed floating-point add/subtract facility using LSI shift matrix parts and a normalization scanner implemented with "priority encoder" MSI parts. A complete shift matrix such as this one will provide a hardware shortcut, expediting the add/substract portion of floating-point operations, he claimed.

The shift matrix would be able to shift a full computer word in parallel by any number of bit positions up to at least the word length, while the normalization scanner would examine the leading nonzero digit in a floating-point result, Hastings explained.

"What array-multiplier LSI chips have done for multiplication in processors, shift matrix chips can do for floating-point addition and subtraction and shift instructions by the handling and even instruction parsing," he said.

John Birkner, product planning manager of Monolithic Memories, Inc., noted PAL architecture is superior to Proms for sum-of-product expressions. A PAL can also replace as many as five small-scale integration (SSI)/MSI packages for the task of handling memory-to-processor handshake.

A PAL, he explained, has a programmable And array and a fixed Or array, which can be more reliable than Proms, which glitch when transforming input such as address lines into output.

With programmable logic, the designer gets a "custom integrated circuit (IC) he can buy as an inexpensive high-volume, multiple-sourced virgin device and then customize on commonly available programmers," Birkner said.

Gerald Shapiro, technical director of array processors for Analogic Corp., advocated using memory rather than waiting for specialized arithmetic chips. The use of memory with a few multipliers and adds is a "quick, cost-effective approach to computing nonlinear functions accurately.

"The multiply rate can be lower, and dedicated low-density arithmetic functions can be avoided. These techniques use the leading bits of a variable to select table values to enter the arithmetic process."

Executive Corner

• Edward C. Reading has been named president and chief executive officer of Digital Scientific Corp.

• Charles E. Nelson has been named vice-president of finance for Florida Software Services, Inc.

• Nugent McMillin is now vice-president of computer services at Bowne Information Systems.

• Robert O. Heckman has been named director of technology for Informatics, Inc.'s Application Products Division.

• James R. Johnson has been appointed vice-president of Informatics, Inc.'s Application Development Systems (ADS).

• Aubrey C. Tobey has been named director of marketing of GCA Corp.'s IC Systems Group.

• Derek K. Bennett has been named director of product engineering for Bunker Ramo Corp.

• Martin L. Schectman has been appointed vice-president and general manager of the Coated Products Division of Graphic Controls Corp.

• John W. Collinson has been appointed vice-president and general manager of Norango Computer Systems, Inc.

• Edward Driscoll has been named director of industrial marketing for Periphonics Corp.

• Paul Binsfield has been named vice-president of eastern field operations for Magnuson Systems Corp.

• Stephen Fisher has been named vice-president of sales for Compuserve, Inc.

• William F. Deller has been named divisional vice-president of System 7000 domestic sales for Inforex, Inc.

• Ralph C. McAuley has been appointed group vice-president of the Bank Services Division and David C. Jones has been named corporate vice-president of banking software marketing for Anacomp, Inc. Allen F. Proske has been named corporate vice-president and assigned to the Bank Services Division.

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Sears' Buyer Hits Personal Computer Selling

By Molly Upton
Special to CW

SAN FRANCISCO — Although personal computers promise a large profit potential, "there is probably more market research done on a bar of soap" than on these electronic products.

This was the message conveyed by Jerry Coll, Sears Roebuck and Co.'s buyer of personal computers, at a conference session held here recently.

"We are seeing only the top of the iceberg," Coll stated, adding the biggest weakness in the industry is its failure to design simple products. If market research were done in advance of product development, the market could be even bigger.

The rules have not been written for mass consumer sales of electronic devices, and Sears is having to write some of its own. For instance, there is no repair information available on the products Sears will offer, so it is starting with a 90-day warranty because that is standard in the industrial world, Coll added.

In other areas, though, a lack of standardization could hurt mass merchandising. For instance, while hobbyists can cope with the slight variations in Basic, one cannot expect the mass market to do the same, Coll said. The cartridges are not interchangeable, and such devices as phone modems have limited interchangeability.

This lack of standards will require retailers to maintain more stock and spend more time selling, Coll said.

Coll divided electronic products into three categories according to the manner in which they can be marketed.

Category one consists of products that require no special knowledge or lengthy selling time. These include low-price calculators, watches and dedicated video games sold in locations such as discount houses and drugstores.

Mass merchandising focuses on category two products, which require moderate knowledge and limited selling time — five to 20 minutes. The products include scientific calculators and programmable video games.

Products in the third category require extensive knowledge of the product and more than 20 minutes to sell. Personal computers and audio equipment fall in this category. Computer specialty shops say a sale takes three hours of selling time, Coll stated.

Coll expects forthcoming personal computer products to fall in category two rather than three. To effect this transition, stores should be prepared to train sales personnel extensively, develop sophisticated displays to help such personnel and work with manufacturers to develop simpler products.

The lines between categories are not always clear. Category one products have been on the market several years, and their overriding problem is profitability. The opportunity for mass merchandising is very limited unless one consolidates sources and expands the amount of personal labeling, Coll said.

For instance, mass merchandisers need to write contracts 18 to 24 months in advance of the sale of the last item or six months before first delivery. This time lead presents a large risk because of the rapid changes in electronics, he stated.

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Marketers Told To Study Basics

(Continued from Page 57)

ate inventory because he doesn't see the whole market picture, Hamilton explained. It also becomes less feasible to design end products. The sale becomes a buyer sale rather than a sale between buyer and engineer.

How to Motivate

As important as redefining the role of the distributor is the need to motivate the direct sales force, the primary channel available to most manufacturers, according to Gordon Smith, vice-president of marketing for Memorex Corp.

Smith outlined three ways to accomplish this: use the "player-coach" concept, hold "old-fashioned" sales meetings and rank salespeople.

The player-coach concept calls for a manager to show interest in the players as well as in the game, make calls with promising members of the sales force, choose the ones worth working with, then build around them, he explained.

In sales meetings, Smith recommended the use of technology to eliminate geographical obstacles. Memorex, for example, makes conference calls once a week at a prescribed time and uses video cassettes to communicate with its sales organization.

Ranking members of the sales force is the least expensive, yet most effective way to motivate, he said, because even the most blase salesperson wants to be successful.

Agreeing was Charles Tindal, president and chairman of Col-Ins-Co, who said there could be more product changes in the next decade than perhaps in the last 2,000 years.

But while the electronics industry will shower the market with more sophisticated yet low priced products than in previous years, users will demand more services. As a result, Tindal pointed to four keys to successful marketing in the '80s: provide additional services, design products in keeping with the state of the art, maintain the credibility of sales engineers and manufacturers' reps and emphasize a synergistic approach to selling.

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Senior Database Analyst

Applicants should have a degree and 5+ years' experience with large IBM systems. In-depth experience in the use and operation of a DBMS (preferably IDMS), and proficiency in IBM/370 Assembler, COBOL, and JCL are required. Experience in any of the following is desirable: CICS, Culprit, Mark IV, Panvalet, and TSO.

Should be highly motivated, well organized, and possess good communicative and interpersonal skills.

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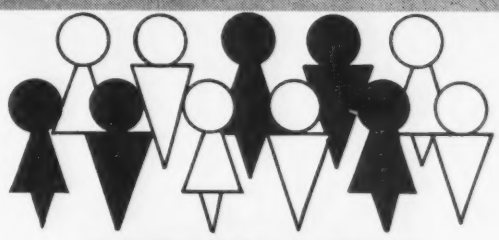

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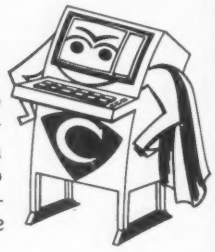

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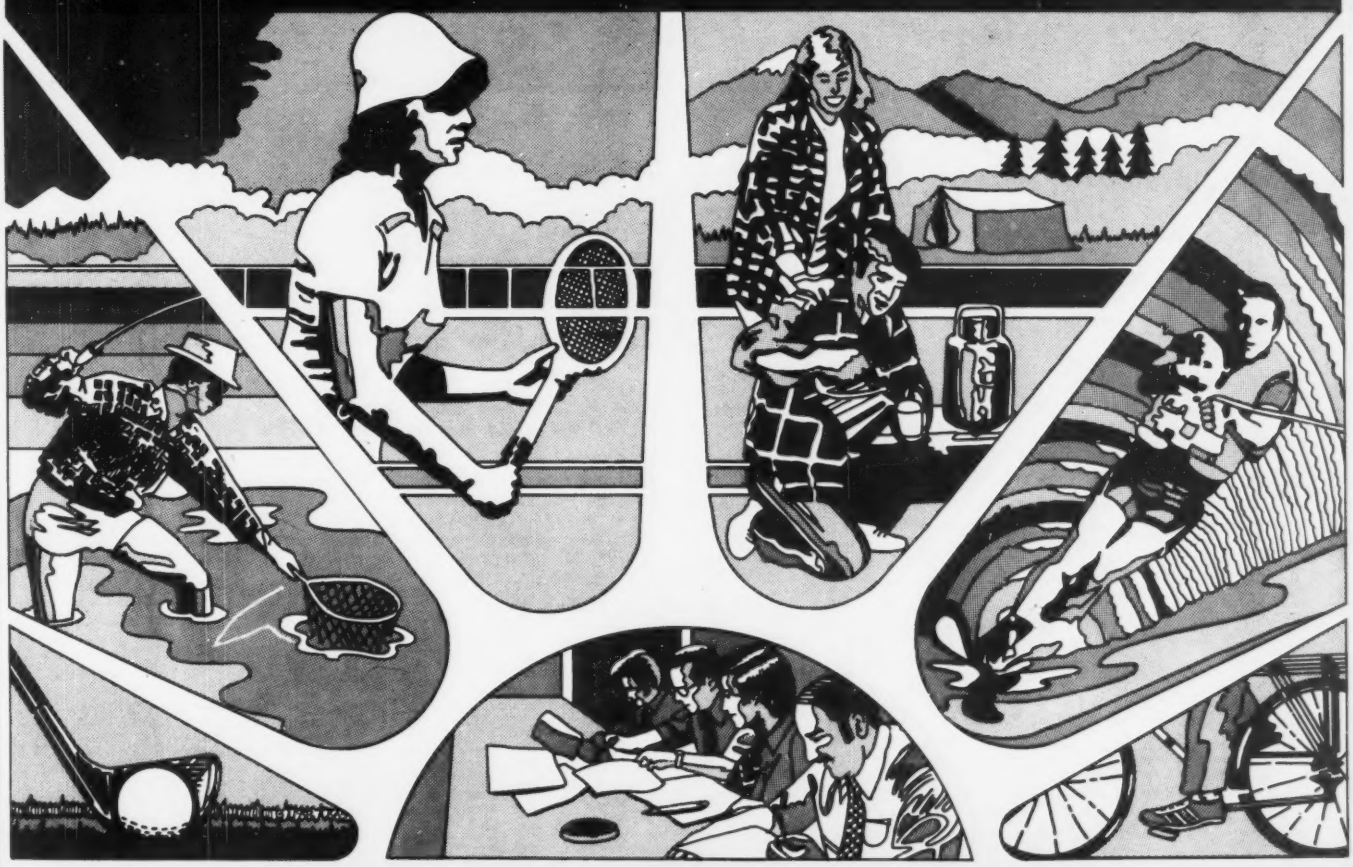

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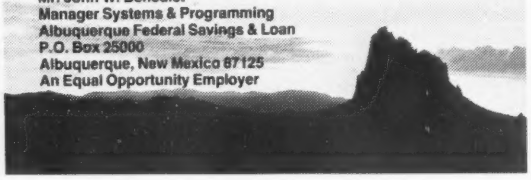

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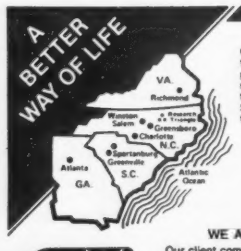

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TECHNICAL ADVISOR
FOR STATE OF ARKANSAS
DEPT. OF COMPUTER SERVICES

RESPONSIBILITIES: Review and evaluate user requests and vendor proposals for DP equipment and services. Provide technical advice to systems planners for new development. Serve as a consultant in areas of expertise, etc.

QUALIFICATIONS: BA or BS in computer sciences, math or related field, plus five years in data processing, teleprocessing or data communications (Job-related experience may be substituted for education). Thorough knowledge of DP concepts, methods and standards, computer hardware and software, and teleprocessing facilities and networks.

WHY US? Competitive salary, excellent benefits, and professional growth opportunities. Also, central Arkansas is a beautiful place to live! We're a small but progressive community, with hunting, fishing, lakes and forests within 30 miles.

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for Computer Network

Career opportunity for a Senior Systems Programmer with 2-5 years of experience in large-scale IBM operating systems. Full background in Assembler language programming required. Experience with MVS is desirable.

The New Jersey Educational Computer Network (NJECN) is a cooperative organization of institutions of higher education providing academic and administrative computer services. NJECN operates an IBM 370/-168-158 computing system, with a large-scale data communications network.

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AMCA

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If you're interested in Raytheon's working tour of America, please forward your resume to: Jerry Minihan, Raytheon Service Company, 2 Wayside Road, Burlington, MA 01803.

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The position will be for San Francisco and Palo Alto locations and about 10% travel will be required.
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To analyze, design and implement CAD techniques for the automated layout and other aspects of printed circuit board design on a mini-computer based interactive graphics system.

Candidate should have an MS in EE/CS and a BS in EE. Knowledge of electrical engineering principles underlying the design and layout of printed circuit boards and electrical schematics, a strong mathematical background including optimization algorythms, familiarity with computer based image processing, mini-computer systems and FORTRAN knowledge required. Salary, $19,000 per year. Please direct your resumes to Ms. Y. Yang, Human Resources Department, Productivity Systems Division, 201 Burlington Road, Bedford, MA 01730.

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Extension 302

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These seminars will be conducted by Mr. Stephen Crane, Manager of Education Systems for M.I.S. For further information, or to ask about in-house presentation of these seminars, call or write:

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The individual will develop systems designs for models and other applications, write specifications for them, program, test, and debug them, and document the finished product. Throughout this process, the individual will interact directly with all personnel levels within the Firm's marketing groups. We require a college degree and Appropriate Fortran and Basic programming experience.

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If you are looking for high visibility, personal growth and advancement opportunity, please send your resume to **Personnel Manager, Plantronics, Inc., 345 Encinal Street, Santa Cruz, CA 95060.** An equal opportunity employer m/f/h.

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Will provide technical support to 1100 systems, system and application programming, as well as training to applications programmers. Requires a college degree in business administration, computer science or related work experience. Must have a background and systems level training in Univac 1100 EXEC 8 operating system, 1100 assembly language and the ability to communicate well in oral and written form.

A career with Mini-Computer Operations offers you a stable, rewarding career, accompanied by a compensation package that is second to none in the industry. **Submit your resume in complete confidence to the address below, or phone Employment at 714/833-2400, Ext. 327, for additional information.**

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digital

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Robert C. Etherton, Chairman
Department of Physics
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Box 2109, University Station
Murray State University
Murray, Kentucky 42071

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SENIOR SYSTEMS ANALYST

BS Degree with CDP and five years experience as Senior Systems Analyst. Heavy Systems analysis or operations research required. Must be competent in COBOL, Fortran, PL1, Basic and IDEA languages. Experience with higher math, statistics and health care management concepts desirable. Will be responsible for computer program design and project leadership.

Comprehensive Health Services
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CHSD

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DESIGN VERIFICATION PROGRAMMING: To apply assembly language programming and knowledge of data communications and microprocessor architecture to a hands-on environment in support of the very latest equipment engineering. BSCS/BSEE OR equivalent.

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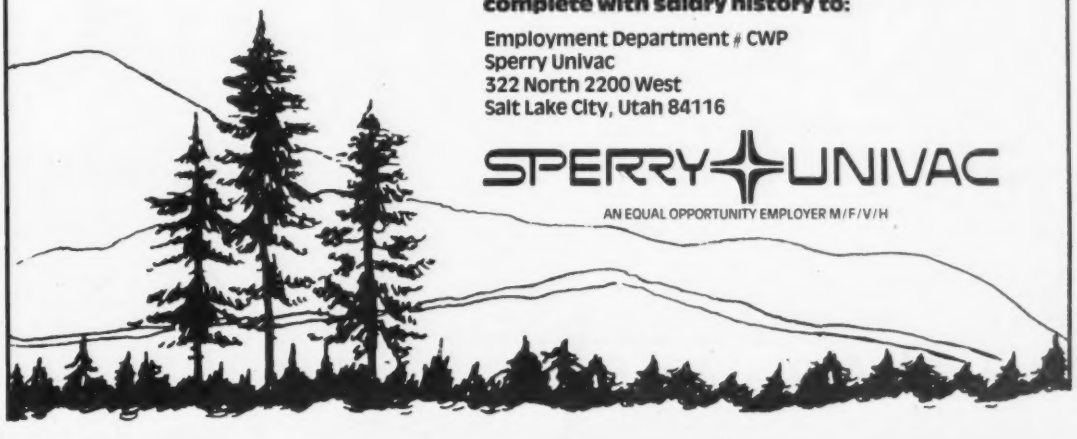

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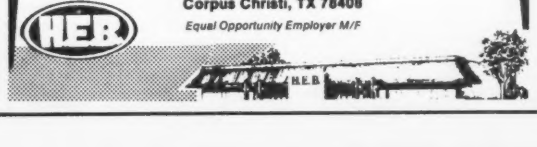

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NCR		YOU
(STX) CONSIDERING A CAREER MOVE? (ETX)	→	
	←	(STX) POSSIBLY, TELL ME ABOUT NCR (ETX)
(STX) NCR COLUMBIA OFFERS CHALLENGING DEVELOPMENT (ETX)	→	
	←	(ACK)
(STX) MICROCOMPUTER BASED COMMUNICATION PROCESSORS (ETX)	→	
	←	(ACK)
(STX) FRONT END PROCESSORS (ETX)	→	
	←	(ACK)
(STX) REMOTE TERMINAL CONTROLLERS (ETX)	→	
	←	(STX) HOW ABOUT NETWORKING? (ETX)
(STX) NCR DISTRIBUTED NETWORK ARCHITECTURE (ETX)	→	
	←	(ACK)
(STX) PACKET SWITCHING, MESH TOPOLOGY, ACCESS METHODS (ETX)	→	
	←	(ACK)
(STX) PLUS INTERCONNECT TO OTHER NETWORKS (ETX)	→	
	←	(STX) WORKING/LIVING CONDITIONS? (ETX)
(STX) THE BEST STATE OF THE ART HARDWARE (ETX)	→	
	←	(ACK)
(STX) EXCEPTIONAL PEERS, GROWING ORGANIZATION (ETX)	→	
	←	(ACK)
(STX) LOW COST OF LIVING, GREAT WEATHER/RECREATION (ETX)	→	
	←	(STX) SOUNDS GOOD, LET'S GET TOGETHER (ETX)
(EOT)	→	

Here is some background for your "transmission".

The business world is moving rapidly into computer networking; and the heart of distributed processing systems is *data communications.* NCR is meeting the challenge with distributed network architecture (NCR/DNA) for major financial, retail and industrial markets. As a fast-expanding center for the design and development of data communications processors, drivers, and mainframe interfaces and linkages, NCR/Columbia is central to NCR's whole thrust in distributed data processing.

If you have 3 or more years experience in systems programming, systems analysis, or systems design/architecture in any of the areas listed opposite, communicate with us promptly. Our involvement is so broad that we are far more interested in the quality of your systems experience than in any specific functional fit.

Our professional environment is matched by our living environment. Columbia, South Carolina is one of the sunbelt's most attractive cities. The Atlantic seashore and the Great Smoky Mountains are within reach; large freshwater lakes are minutes away. Columbia offers an easy lifestyle that includes country or city options, affordable real estate values, and low taxes. It is also the home of fine educational institutions including the University of South Carolina.

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3M

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Mr. Alec Williams
Director of Personnel
Furman University
Poinsett Highway
Greenville, S.C. 29613

Application deadline is October 31, 1979

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Extensive experience with NOMAD data base applications required. Working knowledge of PL/1 or other high level language also highly desirable. A team member is needed to help develop a refinery maintenance system using NOMAD. Also, an analyst is needed to help design and develop a refinery data base system. Location will be in San Francisco or at our nearby refinery in Richmond. Refer to job #93007.

Send resume to: Standard Oil Company of California, Professional Employment Office, P.O. Box 3495, San Francisco, CA 94119.

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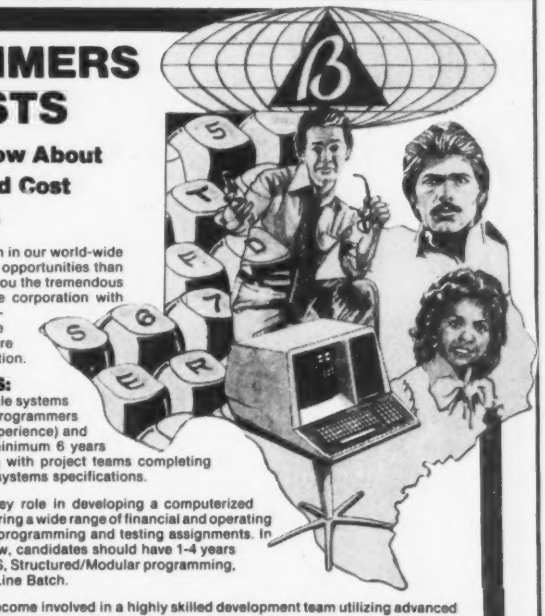

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Will be responsible for performing research in the area of distributed computer systems and, in particular, the analysis and design of concurrency control mechanisms for distributed database systems. The research encompasses all aspects of concurrency control, i.e. correctness, performance and robustness, and aspects of distributed performance and database system integrity and consistency.

A PhD in computer science is required. Salary range: $28,000 — $35,000.

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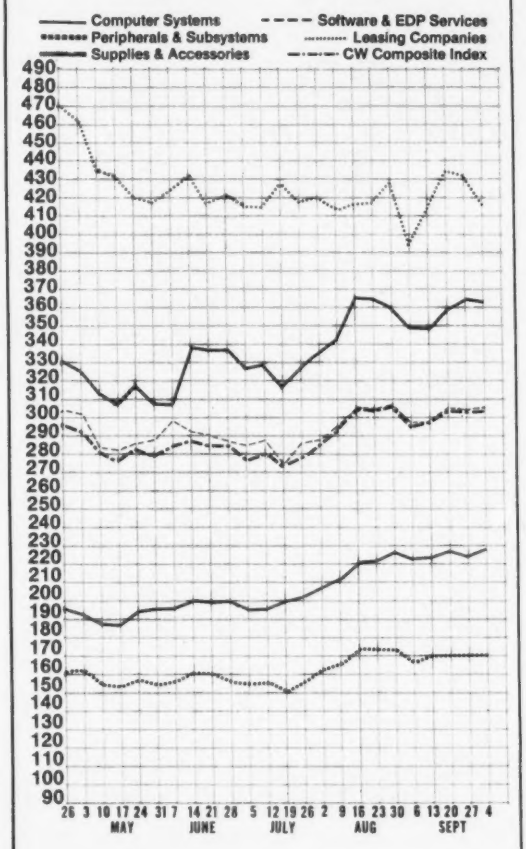

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2. Date of filing: September 28, 1979
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10. Extent and nature of circulation:

	Average No. Copies Each Issue During Preceding 12 Months	Actual No. Copies of Single Issue Published Nearest to Filing Date
A. Total number of copies printed (net press run)	105,420	109,787
B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales	None	None
2. Mail subscriptions	95,983	101,780
C. Total paid circulation	95,983	101,780
D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	3,315	3,535
E. Total distribution (Sum of C and D)	99,298	105,315
F. Copies not distributed		
1. Office use, left over, unaccounted, spoiled after printing	6,122	4,472
2. Returns from news agents	None	None
G. Total (Sum of E, F1 and 2 - should equal net press run shown in A)	105,420	109,787

I certify that the statements made by me above are correct and complete.

W. Walter Boyd
President

TRADE*QUOTES

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, OCTOBER 3, 1979

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E		1978-79 RANGE (1)	CLOSE OCT 3 1979	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	21- 69	20 1/2	-1 5/8	-7.3
N	BURROUGHS CORP	59- 87	72 5/8	-2 1/4	-3.0
O	COMPUTER AUTOMATION	11- 44	11 3/4	- 1/2	-4.0
N	CONTROL DATA CORP	23- 50	50 1/8	+1 3/4	+3.6
O	CRAY RESEARCH INC	8- 45	44 1/2	+4 1/2	+11.2
N	DATA GENERAL CORP	42- 74	68 5/8	+ 7/8	+1.2
N	DATAPOINT CORP	34- 89	85	-2 1/4	-2.5
N	DIGITAL EQUIPMENT	39- 66	63 5/8	- 3/8	-0.5
N	ELECTRONIC ASSOC.	2- 13	7 3/4	- 1/4	-3.1
A	ELECTRONIC ENGINEER.	9- 19	16 1/2	+1	+6.4
N	FOUR-PHASE SYSTEMS	19- 46	39 7/8	+ 7/8	+2.2
N	FOXBORO	28- 44	37 5/8	-1 1/8	-2.9
O	GENERAL AUTOMATION	7- 26	16	- 1/2	-3.0
O	GRI COMPUTER CORP	1- 3	7/8	0	0.0
N	HEWLETT-PACKARD CO	24- 59	58 3/8	+ 7/8	+1.5
N	HONEYWELL INC	43- 83	78 3/8	-1	-1.2
N	IBM	66-321	68 1/4	+ 1/8	+0.1
O	MANAGEMENT ASSIST	9- 29	19 7/8	-2 1/4	-10.1
O	MANUFACTURING DATA S	9- 33	30 1/2	- 1/4	-0.8
O	MICRODATA CORP	10- 34	31	-1	-3.1
O	MINI-COMPUTER SYST	4- 8	4 1/4	+ 1/8	+3.0
O	MODULAR COMPUTER SYS	7- 18	14 1/4	+1 1/4	+9.6
N	NCR	37- 81	74 3/4	- 3/4	-0.9
N	PRIME COMPUTER INC	9- 22	17 1/2	- 1/4	-1.4
N	PERKIN-ELMER	17- 34	31 1/2	+ 7/8	+2.8
N	SPERRY RAND	33- 52	47 5/8	-2 1/2	-4.9
A	SYSTEMS ENG. LABS	11- 24	12 5/8	- 5/8	-4.7
O	TANDEM COMPUTERS INC	13- 37	35	0	0.0
A	WANG LABS.	6- 25	24 5/8	+1 5/8	+7.0

LEASING COMPANIES

O	BOOTHE COMNIER CORP	13- 21	17	0	0.0
O	COMDISCO INC	3- 21	15 1/2	- 3/4	-4.6
A	COMMERCE GROUP CORP	1- 1	3/8	- 1/8	-25.0
A	COMPUTER INVSTRS GRP	1- 7	3	- 1/4	-7.6
O	CONTINENTAL INFO SYS	3- 15	3 1/4	- 1/4	-7.1
M	DATRONIC RENTAL	1- 4	2 7/8	0	0.0
A	DCL INC	3- 5	5 1/4	0	0.0
N	DPF INC	8- 14	9 1/4	- 5/8	-6.3
N	ITEL	8- 36	8 3/8	- 5/8	-6.9
N	LEASCO CORP	24- 55	49 5/8	-1 7/8	-3.6
O	LEASPAC CORP	1- 4	3/8	0	0.0
A	PIONEER TEA CORP	2- 7	3 3/8	+ 1/4	+8.0
N	U.S. LEASING	13- 20	17 3/8	+1	+6.1

SOFTWARE & EDP SERVICES

O	ADVANCED COMP TECH	1- 2	1 1/8	- 1/8	-10.0
O	ANACOMP INC	8- 24	23 3/4	+ 1/4	+1.0
A	APPLIED DATA RES.	8- 17	11 3/8	- 1/4	-2.1
N	AUTOMATIC DATA PROC	24- 38	38 1/8	+1 3/8	+3.7
O	COMPU-SERV NETWORK	5- 16	13 1/4	+ 1/4	+1.9
O	COMPUTER HORIZONS	1- 9	2 3/4	- 1/4	-8.3
O	COMPUTER NETWORK	5- 16	5 3/4	- 1/4	-4.1
N	COMPUTER SCIENCES	8- 17	16	+ 1/2	+3.2
O	COMPUTEN TASK GROUP	1- 7	6 1/2	0	0.0
O	COMPUTER USAGE	2- 4	2 1/4	0	0.0
O	COMPUT AUTO REP SVC	4- 10	6 1/4	- 1/4	-3.8
O	COMSHARE	9- 26	16 3/4	+ 1/4	+1.5
O	CULLINANE CORP	14- 33	24 3/4	0	0.0
O	DATA DIMENSIONS INC	2- 9	2 1/4	+ 1/4	+12.5
O	DATATAB	1- 4	1 1/2	+ 1/4	+20.0
N	ELECTRONIC DATA SYS.	15- 28	24 3/8	+ 1/4	+1.0
O	INSYTE CORP	1- 3	1 5/8	0	0.0
O	IPS COMPUTER MARKET.	2- 3	3 1/8	+ 1/8	+4.1
O	KEANE ASSOCIATES	3- 6	5	0	0.0
O	KEYDATA CORP	1- 4	4 1/8	- 1/8	-2.9
A	LOGICON	10- 19	16 3/8	0	0.0
O	NATIONAL DATA CORP	7- 16	15 5/8	+ 1/2	+3.3
A	ON LINE SYSTEMS INC	12- 30	24 1/2	-1	-3.9
N	PLANNING RESEARCH	4- 10	6 1/2	- 1/8	-1.8
O	PROGRAMMING & SYS	1- 1	1 1/4	0	0.0
O	RAPIDATA INC	3- 7	4 1/4	+ 1/8	+3.0
O	REYNOLDS & REYNOLD	18- 36	32 1/2	- 3/4	-2.2
O	SCIENTIFIC COMPUTERS	3- 9	7 3/8	+ 1/4	+3.5
N	TYMSHARE INC	18- 46	45 3/4	- 1/4	-0.5
A	URS SYSTEMS	5- 8	7 3/8	+ 1/4	+3.5
N	WYLY CORP	1- 7	5 3/4	- 1/4	-4.1

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-MULT	13- 32	16 3/8	- 5/8	-3.6
N	AMPEX CORP	10- 19	17 7/8	- 1/4	-1.3
O	ANDERSON JACOBSON	5- 12	10 7/8	- 7/8	-7.4
N	APPLIED DIG DATA SYS	8- 22	8 1/8	- 1/4	-2.9
O	BEEHIVE INT'L	3- 7	4 3/8	- 3/8	-7.8
A	BOLT,BERANEK & NEW	6- 17	16 1/2	+1 3/4	+11.8
N	BUNKER-RAMO	10- 29	28 7/8	- 1/8	-0.4
A	CALCOMP	3- 13	9 3/8	- 1/4	-2.5
O	CAMBRIDGE MEMORIES	2- 9	2 1/8	+ 1/8	+6.2
N	CENTRONICS DATA COMP	10- 54	52 7/8	+1 7/8	+3.6
O	COGNITRONICS	1- 4	2 5/8	+ 1/8	+5.0
O	COMPUTER COMMUN.	6- 10	7 5/8	+ 1/4	+3.3
O	COMPUTER CONSOLES	4- 16	13 1/4	0	0.0
A	COMPUTEN EQUIPMENT	3- 6	5	- 1/4	-4.7
O	COMPUTEN TRANSCEIVER	1- 5	3 5/8	- 1/8	-3.3
O	COMPUTERVISION CORP	5- 39	38 1/4	- 1/2	-1.2
N	CONRAC CORP	13- 26	16 1/2	- 1/4	-1.4
A	DATA ACCESS SYSTEMS	0- 10	7 7/8	- 3/8	-4.5
A	DATA PRODUCTS CORP	13- 25	17 1/2	0	0.0
O	DATUM INC	2- 6	2 3/8	0	0.0
O	DECISION DATA COMPUT	2- 6	3 3/8	- 3/4	-18.1
O	DELTA DATA SYSTEMS	1- 1	3/4	0	0.0
A	DOCUMATION INC	0- 34	21 3/8	+ 1/8	+0.5
O	DATARAM CORP	0- 32	26 1/2	-1	-3.6
N	ELECTRONIC M & M	3- 9	3 1/2	- 1/4	-6.6
O	FABRI-TEK	1- 2	5/8	0	0.0
O	GENERAL COMPUTER SYS	1- 3	2 3/4	0	0.0
O	GENERAL DATACOMM IND	9- 21	17	0	0.0
N	HAZELTINE CORP	10- 18	16 3/4	- 1/4	-1.4
N	HARRIS CORP	17- 36	32 1/8	- 1/8	-0.3
O	INFOREX INC	4- 11	4	0	0.0
O	INFORMATION INTL INC	7- 12	10 1/2	+2 1/4	+27.2
O	INFOTON	1- 3	3	+ 1/4	+9.0
O	INTEL CORP	20- 65	62 1/2	- 1/2	-0.7
O	INTERSIL	7- 25	24 1/2	+3 3/4	+18.0
A	LUNDY ELECTRONICS	4- 8	6 3/4	+ 1/8	+1.8
O	MSI DATA CORP	7- 19	7 3/8	- 3/8	-4.8
N	MEMOREX	20- 59	19 3/4	-1	-4.8
N	MOHAWK DATA SCI	0- 15	12 7/8	+ 3/8	+3.0
O	OMEX	2- 8	7 1/2	0	0.0
O	PARADYNE CORP	9- 22	20 1/2	+1 1/8	+5.8
O	PENRIL CORP	5- 12	10 1/4	+ 1/8	+1.2
N	PERTEC CORP	8- 17	11 7/8	- 1/8	-1.0
A	POTTER INSTRUMENT	2- 2	1 3/4	0	0.0
O	RECOGNITION EQUIP	0- 13	7	+ 1/8	+1.8
O	SCAN DATA	1- 5	1 7/8	+	+3.4
N	STORAGE TECHNOLOGY	15- 46	17 3/8	- 1/4	-1.4
O	T BAR INC	11- 25	21 1/4	-3 1/4	-13.2
O	TALLY COMP.	4- 14	13 1/4	+ 1/2	+3.9
A	TEC INC	0- 13	8 1/4	0	0.0
N	TEKTRONIX INC	33- 61	59 3/8	- 3/4	-1.2
N	TELEX	3- 9	4 1/2	- 1/8	-2.7
O	TESDATA SYSTEMS CP	9- 26	9 3/4	0	0.0
O	WILTEK INC	1- 2	1/2	0	0.0

SUPPLIES & ACCESSORIES

A	AMERICAN BUS FROOS	0- 12	11 3/4	+ 1/4	+2.1
O	BALTIMORE BUS FORMS	1- 4	1	+ 1/4	+33.3
N	BARRY WRIGHT	14- 34	20	- 1/8	-0.6
O	CYBERMATICS INC	1- 1	1	0	0.0
O	DUPLEX PRODUCTS INC	13- 31	27 3/4	+ 1/8	+0.4
N	ENNIS BUS. FORMS	5- 21	18 1/4	+ 1/8	+0.6
N	3M COMPANY	43- 66	51 1/4	-1 1/8	-2.1
O	MOORE COMP LTD	26- 34	31 3/4	0	0.0
N	NASHUA CORP	18- 37	29 1/8	+ 3/4	+2.6
O	STANDARD REGISTER	20- 29	26 3/4	+ 1/2	+1.8
A	TAB PRODUCTS CO	8- 19	17 3/4	- 1/8	-0.6
A	WABASH MAGNETICS	10- 22	14 3/4	- 3/8	-2.4
N	WALLACE BUS FORMS	18- 33	27 7/8	- 1/2	-1.7

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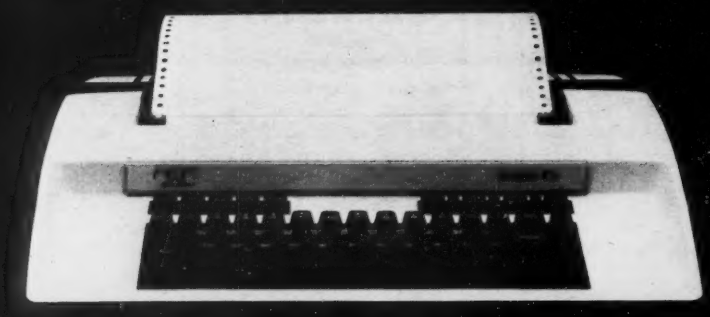

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